TRANSPORTATION

ADOPTED 1992 MASTER PLAN

ALEXANDRIA, VIRGINIA

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I. INTRODUCTION

The integration of transportation and land use planning is essential if the City of Alexandria is to continue to develop in a progressive, orderly manner during the decade of the 1990s and into the 21st Century. This plan looks ahead 10 to 20 years, and addresses the changes that will be required to accommodate the travel of people and the movement of goods into, within and through, the City. It is based on the best available information, and it relies upon current development and travel demand forecasts.

The purpose of this transportation plan is to provide a basis for assessment of future needs. Changing land uses inside and outside the City necessitate a plan that provides flexibility. No transportation plan is intended to dictate the future, nor should it foreclose the possibility of new facilities or improvements to existing facilities, regardless of how unpopular they may be today.

Transportation facilities and services should optimize safety and efficiency while minimizing travel time, inconvenience, and environmental disruption. It should be understood that the transportation facilities and services called for in this transportation plan are constrained by fiscal realities, and that, over time, the priorities of the City government might change.

A. GOALS AND OBJECTIVES

During 1989, the Alexandria City Council acted on a number of major policy questions aimed at enhancing the quality of life for all citizens of Alexandria. The goals that were established are as follows:

1. The City of Alexandria shall develop and manage a safe, comprehensive transportation system, consistent with the City's land use policies, which is designed to move people and goods at a satisfactory level of service with minimal community disruption and environmental impact.

2. The City of Alexandria shall achieve a balance between the development which is allowed and the transportation system necessary to meet the needs created by that development.

3. The City of Alexandria shall provide or require to be provided with enough parking to adequately meet the needs of each land use type, but not to the extent that parking availability encourages the use of the single-occupant private auto.

The specific objectives to achieve these goals are as follows:

- Foster compatibility between transportation facilities and the adjacent land uses.
- Minimize the impacts of traffic, especially the impacts on residential neighborhoods.
- Improve the safety and efficiency of the existing street system and the continuous flow of traffic.
- Increase the availability and use of a variety of public transportation options.
- Reduce the rate of increase of vehicle trips.
- Encourage the use of multi-occupant vehicles.
- Reduce air pollution, noise, and other nuisances from transportation activities.

- o Increase the revenues used for transportation improvements, both capital and operating, from the tax base added by the development.

- o Coordinate the timing of development with the timing of transportation improvements needed to serve that development. In this way, the infrastructure needed to serve the City should be in place, either before or concurrent with a development to minimize traffic impacts.

- o Relate the intensity and mix of development in any given area to the ability of the transportation system to satisfy transportation demand.

- o Continue the Traffic Management Plan (TMP) and Traffic Impact Study (TIS) process as a means of managing the transportation needs and reducing traffic impacts of new development.

B. FUNCTIONAL CLASSIFICATION OF FACILITIES

There are five categories of functional classification that are generally recognized by the Federal Highway Administration and the Virginia Department of Transportation. The City of Alexandria adopted a classification system that is slightly different, but its characteristics are generally the same. Map I-1 gives the classification of streets in the City and Appendix A lists the recommended changes. The following list compares two classification systems:

	General Classification	City of Alexandria
1.	Controlled Access Facility	Expressway
2.	Primary Arterial	Arterial
3.	Secondary Arterial	Primary Collector
4.	Collector Street	Residential Collector
5.	Local or Residential Street	Local Street

The section below describes each of these categories:

Controlled Access Facilities - Expressways

Controlled access facilities and expressways are intended to complement the arterial street system by providing for the movement of very high volumes of people and goods, usually greater than 50,000 Average Daily Traffic (ADT). Expressways do not provide direct access to adjacent properties. They form a closed, continuous transportation system between principle traffic generators and attractors. Expressways connect with crossings of major geographical barriers. They frequently act as geographical or psychological barrier between abutting neighborhoods.

Although controlled access highways usually account for about 10% of the total street and highway mileage in an urban area, they carry 40% or more of the daily traffic. Table B-1 gives the comparison of highway facilities in the City of Alexandria, the Northern Virginia subregion, and the Washington, D.C. Metropolitan Area. From a design standpoint, controlled access facilities require wide rights-of-way (120 feet minimum) with four or more travel lanes. Generally, they include medians, shoulders, and grade separated interchanges. Parking or pedestrian access is not allowed adjacent to the travelway. Posted speeds on these facilities in urban areas range from 35 to 55 miles per hour. The interstate system, freeways, expressways, and parkways are classified as controlled access facilities or, in Alexandria's classification as "expressways." Examples of this type of facility include I-395 (Shirley Highway), I-95 (Capital Beltway), and the George Washington Memorial Parkway (north of Slater's Lane).

Primary Arterials - Arterials

Primary arterials serve the main travel corridors by connecting secondary traffic generators such as regional shopping centers, large residential areas, and office complexes with other primary arterials and the interchanges of expressways. These roadways carry relatively high volumes of traffic, between 10,000 to 50,000 ADT. Some access is provided to abutting lands but most traffic is limited to through movements, particularly during the peak hours. Arterials are designed with four or more travel lanes. Medians are optional but are very desirable from a safety standpoint. The right-of-way requirements may vary from 70 to 120 feet. Preferential signalization, signal progression, and linear continuity are essential for arterials. Sidewalks should be provided on both sides of the roadway to serve pedestrian movements. Posted speeds on these streets usually range from 30 to 45 miles per hour. Examples of primary arterials include Duke Street (Virginia Route 236 from western City limits to Henry Street), King Street (Virginia Route 7 from the western City limits to Commonwealth Avenue), Quaker Lane, Seminary Road, Janney's Lane, U.S. Route 1 through the City (Jefferson Davis Highway, Patrick Street, and Henry Street), and Washington Street (Slater's Lane to I-95).

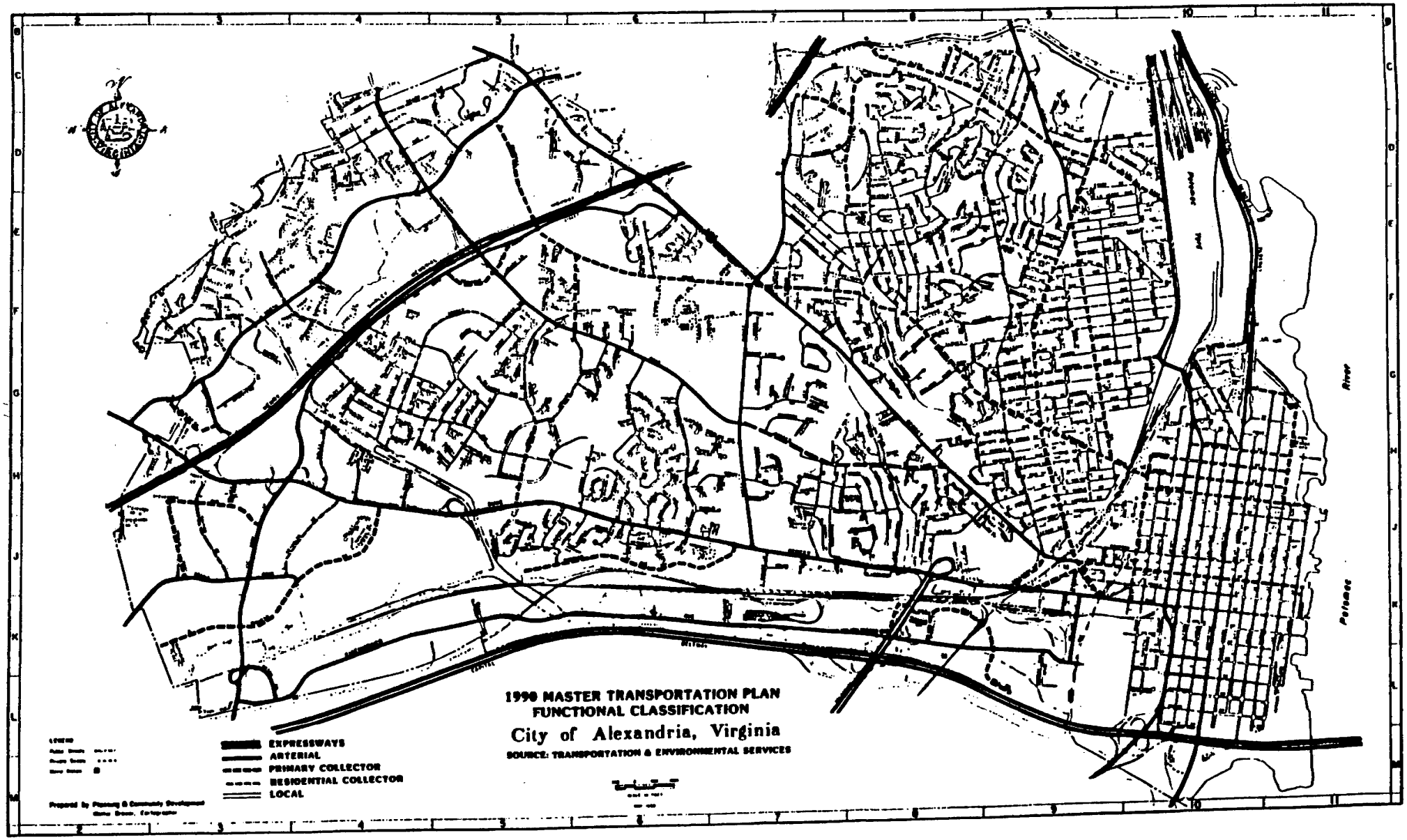
Secondary Arterials - Primary Collectors

Primary collectors serve less concentrated traffic generating areas such as neighborhood shopping centers, high schools, and businesses. They typically carry medium traffic volumes of 5,000 to 20,000 ADT. Primary collectors usually carry an even mix of local and through traffic and link arterials with other facilities. Primary collectors may serve as neighborhood boundaries while providing some local traffic with property access. This class of facility is similar to arterials in design; however, primary collectors generally limited to two travel lanes and provide a lower service-level highway. Also, primary collectors provide access to adjacent properties and have limited preference at signals. Posted speeds range from 25 to 35 miles per hour. Sidewalks should parallel both sides of these facilities. Examples of primary collectors include Braddock Road (from Seminary Road to Commonwealth Avenue), Commonwealth Avenue (from King Street to Reed Avenue), Mt. Vernon Avenue (Commonwealth Avenue to E. Braddock Road), East and West Glebe Road, and Mill Road.

Collector Streets - Residential Collectors

Residential collector streets provide direct service to residential areas, local parks, businesses, and schools by distributing traffic to and from local streets and routing it to higher classified facilities. Trips are relatively short in nature with a lower percentage of through trips. Traffic volumes on residential collector streets are low to moderate, 10,000 ADT or less, but can vary greatly depending on the intensity of the adjacent development. This class of facility is designated to serve areas encompassed by the expressways, arterials, and/or primary collector facilities.

In general, when access to an arterial roadway or primary collector street is greater than one-half mile, residential collector streets are used to provide neighborhood auto access to residential and business developments. They are designed with a minimum of two travel lanes without medians, access control, or preference at signals. Provision of parking is optional, but convenient to the adjacent uses. It is desirable to have sidewalks on both sides of the street. The speed limit is usually 30 miles per hour or less. The importance of this class of the street should not be underestimated. Without these collectors, the local transportation system could not function effectively. Examples of residential collector streets include Cameron Street (from St. Asaph Street to King Street), Prince Street (from Reinekers Lane to St. Asaph Street), Russell Road (from West Glebe Road to King Street), Chambliss Street, Sanger Avenue, Taney Avenue (from Van Dorn Street to N. Jordan Street), and Old Dominion Boulevard.


1990 MASTER TRANSPORTATION PLAN
FUNCTIONAL CLASSIFICATION
City of Alexandria, Virginia
SOURCE: TRANSPORTATION & ENVIRONMENTAL SERVICES
EXPRESSWAYS
ARTERIAL
PRIMARY COLLECTOR
RESIDENTIAL COLLECTOR
LOCAL
Potomac River

Local or Residential Street

The primary purpose of local or residential streets is to provide direct access to individual homes, shops, businesses, and similar traffic destinations. It is essential that direct access be provided to abutting land, for all traffic originates from (or is destined to) these land uses. Local traffic should be encouraged while through traffic should be limited and discouraged. These streets connect local properties to collector streets and, in turn, to higher classified facilities. The design of local and residential streets varies. Generally, there are two lanes for two-way travel, no medians or shoulders, no access control, and no preference at signals. Sidewalks and parking are desirable.

C. ASSUMPTIONS OF THE PLAN

The assumptions used in this analysis are based on past City Council actions and policies; plans and programs by the Virginia Department of Highways and Transportation, the Metropolitan Washington Transportation Planning Board, and the Washington Metropolitan Area Transit Authority. The 1989 study by the Virginia Department of Transportation, Northern Virginia 2010 Transportation Plan, provides the primary basis for the assumptions, as follows:

1. Population, employment and land development will continue to grow in the City and the region, but at a lower rate than the last 10 years.

2. The highest growth rate of population in Northern Virginia will occur in Fairfax, Prince William, and Loudoun Counties. Lower growth rates are expected in Arlington County and in Alexandria.

3. Widening of the Capital Beltway (I-495/I-95), and the Woodrow Wilson Bridge will be made to increase capacity. While the VDOT has recently proposed 14 lanes for the Beltway and the Woodrow Wilson Bridge, all traffic analysis has assumed the C.O.G. projections of 10 lanes.

4. The following highway improvements will be made in Fairfax County to increase capacities:

   - Completion of the Springfield Bypass (Fairfax County Parkway),
   - Extension of South Van Dorn Street from Franconia Road to Richmond Highway.
   - Widening of Little River Turnpike (Route 236) between Fairfax City and I-395 with improvements at the Beauregard Street intersection.
   - Completion of the widening of Telegraph Road to six lanes from I-95 to Franconia Road.
   - Completion of the widening of Van Dorn Street to six lanes from I-95 to Franconia Road.

5. The high occupancy vehicle (HOV) network will be expanded to form an interlocking grid system throughout the region. Those that would most directly affect the Alexandria area are:

   - Provision of HOV lanes on the Capital Beltway from U.S. Route 1 to the Dulles Toll Road.
   - Extension of HOV lanes on I-66 from I-495 to Centreville and Gainesville.
   - Extension of HOV lanes on I-95/I-395 to the Prince William/Stafford County line.
   - Extension of HOV lanes on U.S. Route 1 from Alexandria to Fort Belvoir.
   - Provision of ramp connections from the I-395 HOV lanes to Duke Street.

- o Provision of HOV lanes on Braddock Road from Route 123 to I-495.

6. Metrorail extensions will be implemented during the next 20 years as follows:

   - o The Blue Line will be completed from Van Dorn to Franconia/Springfield.
   - o The Green Line will be completed as planned to serve suburban Maryland.

7. Commuter rail service will be implemented from Fredericksburg and Manassas to Washington, D.C., via Alexandria.

8. Metrobus and DASH bus service will continue to be expanded in the City to meet growing demand, as employment and residential centers develop, and with the opening of the Van Dorn Metrorail Station.

II. EXISTING CONDITIONS AND TRENDS

A. TRENDS AND FORECASTS

Metropolitan Washington including suburban Northern Virginia has one of the fastest growing areas in the nation over the last decade, and the growth is expected to continue well into the 21st century. The Metropolitan Washington Council of Governments (COG) has summarized the trend graphically, with estimated growth factors of key economic variables in Northern Virginia, between 1985 and 2010. Between 1985 and 2010 (Figure II-1), population is estimated to increase by about 50%, and households by about 70% (due to smaller household size). During the same period, employment and the number of automobiles are expected to almost double, resulting in more than doubling of the Vehicle-Miles-Traveled (VMT) throughout Northern Virginia (vehicle-miles-traveled is a measure of vehicular activity, i.e., 10 vehicles traveling 20 miles equals 200 VMT).

The largest growth is expected in the outer suburbs of Fairfax, Prince William, and Loudoun Counties (Figure II-2). Fairfax County will absorb the bulk of this growth. The number of households could increase from about 250,000 to more than 400,000; employment could double from about 300,000 to 600,000; and the number of automobiles could increase from about 500,000 to more than 900,000. In contrast, in Alexandria, the number of households, and the automobile ownership is expected to show only a slight increase. However, employment is expected to increase from about 75,000 to 125,000. Thus, Fairfax County which surrounds Alexandria on almost three sides, is expected to continue to have a dramatic effect in the City.

The work-trips from home to work and back, during the AM and the PM peaks are the essence of the transportation problem and traffic congestion. Between 1985 and 2010 the number of work-trips in Northern Virginia (Figures II-3 and II-4), is estimated to almost double; from 520,000 daily trips in 1985 to 947,000 in 2010. The location of the City on the cross road between suburban Virginia and the District, and being surrounded by Fairfax County, results in high proportion of through-traffic in the City, in particular, during the peak periods traveling north-south. The 1988 City's AM peak hour traffic counts at the northern City limits on U.S.Route 1 and on the George Washington Memorial Parkway (GWMP), showed that approximately 80% of the vehicles were from outside of Alexandria. Approximately 45% of the vehicles on the GWMP, and 33% on U.S. Route 1 were from Fairfax County. Also, the vehicular counts at these locations during the AM peak commuting hours indicate that the majority of the increase in the number of vehicles crossing the City limits during the peak (7-8 a.m.) are due to development changes within the City during a period from 1980 to 1988. Traffic increased by 9% in the peak chart hour at the northern City limits; however, during the same period at the southern City limits, the volumes increased by 33%, suggesting that some 24% of the increase was due to development in the City (Table II-1).

The 1988 City traffic volume counts showed that 14 thoroughfares in Alexandria consistently carry 20,000 or more vehicles per day, 9 facilities accommodate 30,000 vehicles or more, and 4 carry more than 50,000. The Shirley Highway (I-395) and I-95 carry approximately 125,000 vehicles every day. According to the 1988 traffic counts taken at the City limits, the volume has increased by 23% since 1978, an average increase of 2.3% per year. Total 24-hour volumes entering and leaving the City have grown from 451,457 vehicles in 1978 to 555,210 vehicles in 1988 (Shirley Highway (I-395) is not included in this total).

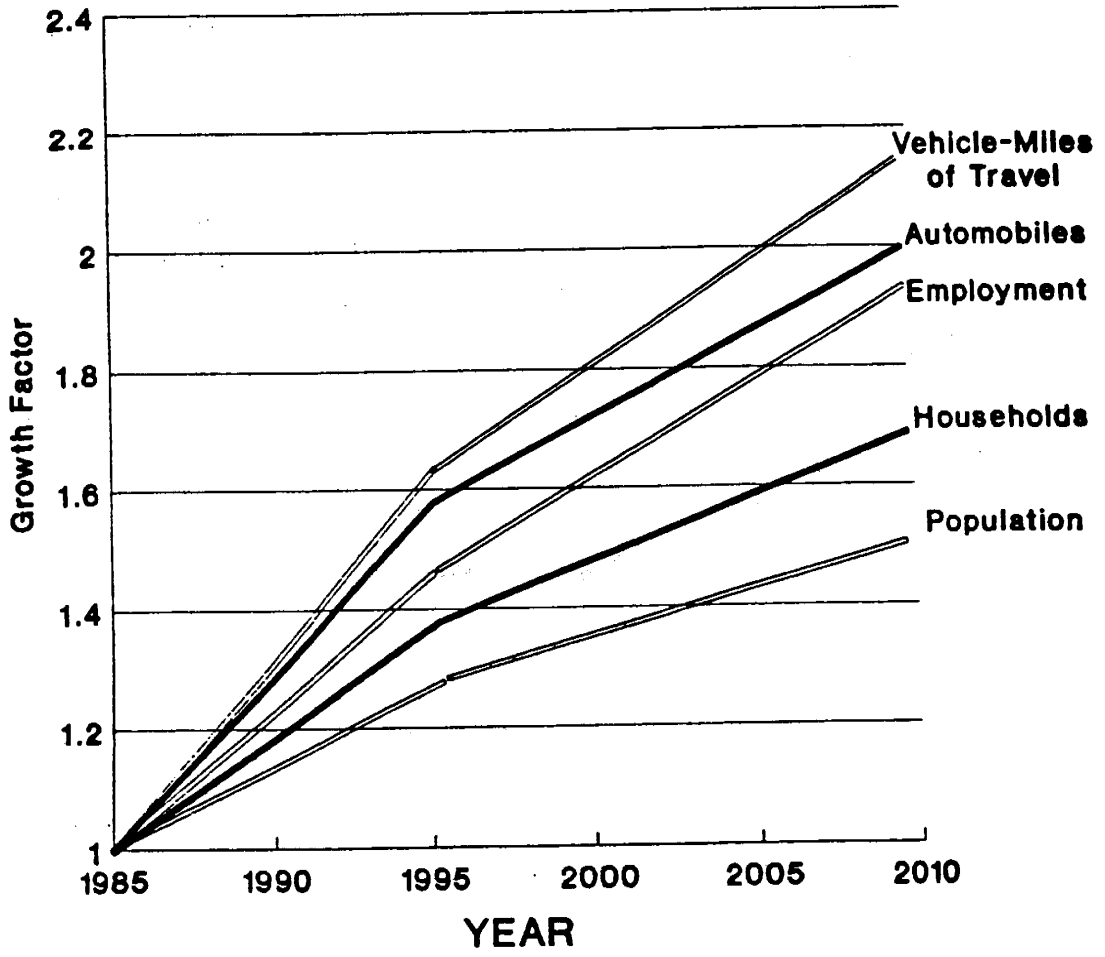
The Work Trip

The work-trip during the peak periods is the essence of the transportation problem in Northern Virginia, as well as in other parts of the region and the country. The work-trip is dominated by automobile travel, much of which in a single occupant vehicle (SOV). The problem is compounded by cross-jurisdictional travel and trips to, from, and through the City.

Figure II-1

Growth Factors - No. Virginia

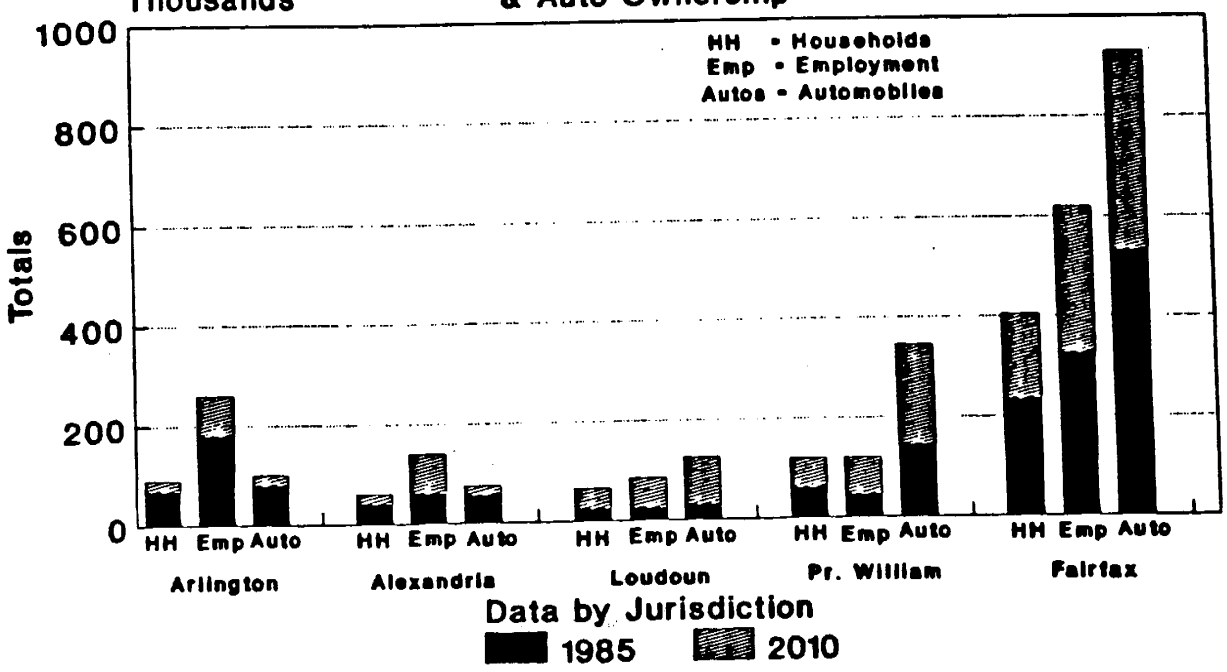
Projected for 1995 and 2010



Source: C.O.G. - 1989

Figure II-2
Growth by Jurisdiction In Northern Virginia - 1985 to 2010

Projected Increases In Housing, Employment & Auto Ownership

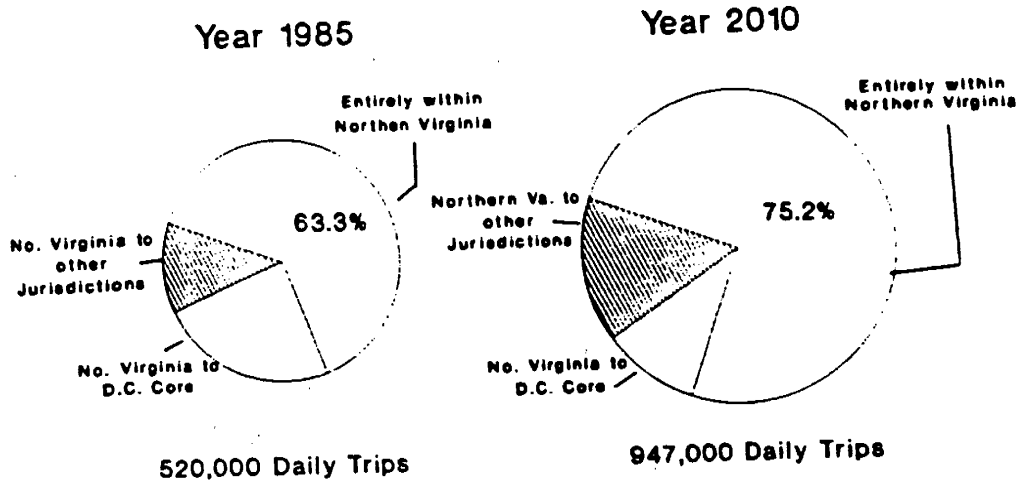


Source: VDOT - 1989

Figure II-3

Growth & Distribution of Home-to-Work Trips

Daily Trips Beginning in Northern Virginia Suburbs

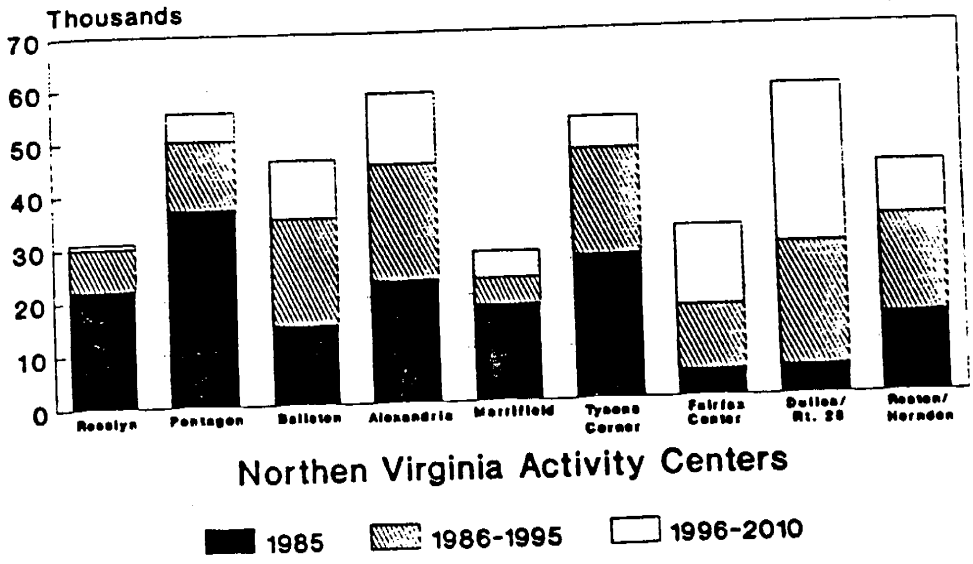


Source: VDOT-1989

Figure II-4

Weekday Home-to-Work Trips

to Northern Virginia Activity Centers



Source: VDOT - 1989

Travel estimates from the Washington COG (shown in Appendix Tables B-2 through B-5), of daily work-trips in the Washington region in the years 1985 and 1995 provide insights to the characteristics of the work-trip (from home to work and back). The tables show the number of trips, and percent use of transit, between any pair of jurisdictions in the region. The tables show trip-origin listed as "FROM," on the left side of each table, to trip-destination, listed as "TO." Thus, for example, Table B-2 indicates that in 1985, there were 31,567 daily person work-trips from Alexandria (ALEX) to the DC Core, and 15,113 internal trips within Alexandria (ALEX) to Alexandria (ALEX).

TABLE 11-1

Summary of Traffic volumes
Northbound U.S. Route 1 and George Washington Memorial Parkway
1980 to 1988

Facility	Location	Time Period 6-7 AM	7-8 AM (peak)	8-9AM
George Washington Memorial Parkway	No. City Limits	+25%	+9%	+5%
	So. City Limits	+28%	+33%	+19%
U.S. Route 1	No. City Limits	+30%	+13%	+11%
	So. City Limits	+34%	+16%	+50%

Source: City of Alexandria.

Daily Person Trips to Work

The tables show daily person work-trips, the average number of person-trips (by any mode of transportation) from home-to-work and from work-to-home during a single work day. Thus, the number of person-trips during the AM (or the PM) is about one half of the daily trips.

In 1985 (Table B-2) Alexandria generated 96,670 bidirectional daily person work-trips (or almost 50,000 during the AM peak). About one third of the trips (31,567) had D.C. destinations, about 15% (15,113) were internal within Alexandria, and another 15% had a Fairfax County/ destinations.

COG estimated that in 1995 (Table B-3) Alexandria will generate 105,340 daily person work-trips, an increase of about 9.4% over 1985. However, the directional distribution would change quite substantially. Almost a third of the trips (29,082) would be internal trips within Alexandria, and only a quarter (26,541) will be to D.C. The number of trips to Fairfax County will remain virtually unchanged (14,974 in 1995 vs. 15,113 in 1985).

Perhaps, the more important statistics concerning the City, are the number of trips attracted to Alexandria, from all other jurisdictions, and the number of trip from Fairfax County/City to the D.C. (Core and Non-Core) and to Arlington County. Many of the latter, attribute to the through-traffic in Alexandria. COG estimated that the number of daily person work-trip from Fairfax to D.C. (Core and Non-Core combined) will increase by about 13%, from 170,879 in 1985 to 192,544 in 1995. Cross-jurisdictional travel will increase substantially, placing increased demands on the circumferential routes.

Transit Use and Car Occupancy

Tables B-4 and B-5 show the estimated percent of transit use in cross-jurisdictional travel to work in the years 1985 and 1995. As expected, the highest proportion of transit use, is to the D.C. Core. It is estimated to be 40% in 1985, and 37% in 1995. The second highest is D.C. Non-Core, 20% in 1985, and 18% in 1995. The third highest is the Arlington Core, 20% in 1985, and 21% in 1995. Alexandria had an overall transit use (to-work) of 7% in 1985, and is estimated by COG to increase slightly to 8% by 1995. The COG estimates do not take into account Transportation Management Plan (TMP) measures, adopted by the City, which are expected to increase transit use beyond the 8% projected for 1995.

The COG also estimated vehicular occupancy on a cross-jurisdictional travel to work. The overall regional average is estimated to remain virtually unchanged, 1.23 persons/car in 1985 versus 1.24 in 1995. Alexandria's average is close to the regional average. It is estimated to be 1.21 in 1985, and 1.22 in 1995. Again, the 1995 COG estimates do not take into account the TMP measures. It is expected that the TMP measures coupled with a number of HOV facilities will increase both transit-use and car-occupancy for the work-trip to Alexandria, above the figures currently estimated by the COG.

Congestion and Level of Service

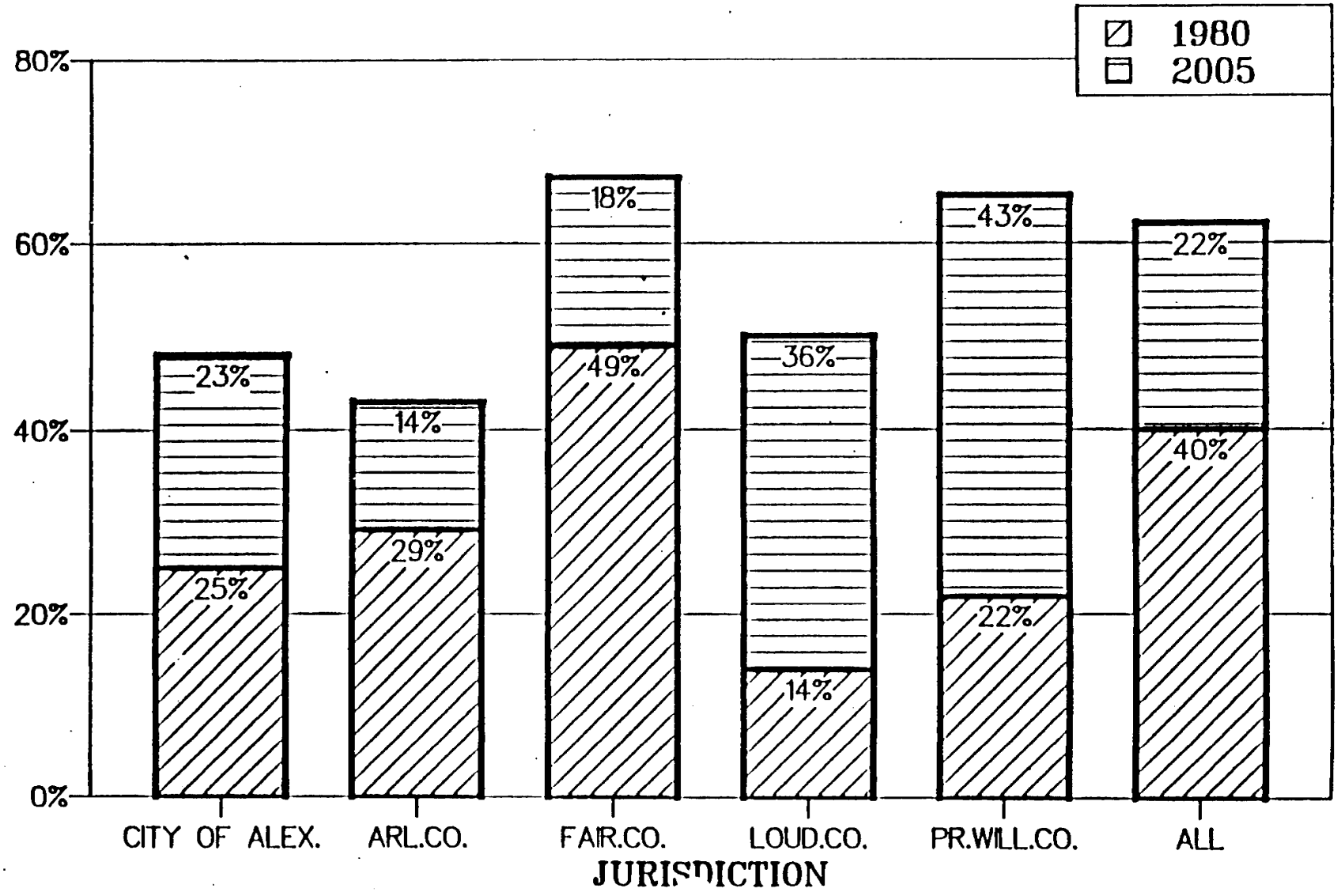
Level-of-Service is the measure of operational conditions of traffic of roads and intersections. The level of service of major commuting corridors in the City is largely dependent on how effective the controlled access facilities adjacent to and serving Alexandria are performing. When I-95 and the Woodrow Wilson Bridge break down, particularly during the afternoon peak period, major routes in the downtown area such as Duke Street, Henry Street (southbound U.S. Route 1), and Washington Street also fail to accommodate traffic adequately. When I-395 is heavily congested, particularly in the morning peak period, traffic is diverted to North Beauregard Street and Van Dorn Street. COG estimates that by the year 2005, 61.9% of peak period vehicles on freeways and arterials in Northern Virginia will be heavily congested at Level-of-Service "E" or "F" (heavily congested), up from 39.3% in 1980. Peak period vehicle miles of travel under heavily congested conditions will range from 43.2% in Arlington to 48% in Alexandria, and 67.4% in Fairfax County (Figure II-5). Peak hour Levels-of-Service for most of the Capital Beltway are expected to deteriorate to "E" and "F". COG estimates that the reduction from Level-of-Service "E" to level of service "F" results in an added one minute of delay time per mile on freeways, and an extra two minutes of delay time per mile on arterials. Thus, a typical 12.4 mile trip will take an extra 12 minutes.

Some City arterials and intersections consistently operate at congested levels regardless of the level-of-service problems on the Beltway or I-395. They include:

- Northbound Washington Street at E. Abingdon Drive in the A.M. peak period -- due to the heavy traffic movements on the G. W. Parkway transitioning with East Abingdon Drive.
- Northbound Washington Street at the southern City limits in the A.M. peak period -- due to heavy traffic flow from a limited access facility, the G.W. Parkway, to an urban arterial with signalized intersections.
- Northbound U.S. Route 1 (South Patrick Street) south of Duke Street in the A.M. peak period -- because of the heavy traffic demand transitioning from three northbound lanes to two unrestricted northbound lanes and because with multiple turning movements through the I-95 interchange.
- Northbound Telegraph Road at Pershing Avenue in the A.M. peak period -- due to heavy traffic flow from Fairfax and I-95 into the Eisenhower Valley.

FIGURE II–5

Percentage of Total Vehicle Miles Traveled (VMT)
Operating at Level of Service E or F : 1980 – 2005



SOURCE : COG – 1986

- Northbound Jefferson Davis Highway (U.S. Route 1) at the northern City limits in the A.M. peak period -- due primarily to the extensive construction currently underway and the Reed Avenue signal operating outside the computer signal system..

- Southbound Telegraph Road at the southern City limits in both peak periods -- due to heavy traffic accessing I-95 and Telegraph Road from Eisenhower Valley and Duke Street.

- Southbound Patrick Street (U.S. Route 1) at Gibbon Street in the P.M. peak period -- due to heavy traffic flow accessing from Gibbon Street to I-95 and high volumes on South Patrick Street.

- Southbound Washington Street at the southern City limits in the P.M. peak period -- due to high volumes of traffic entering Washington Street from I-95 via Church Street.

- Eastbound Duke Street at Henry Street in the P.M. peak period -- due primarily to capacity constraints on U.S. Route 1 between Duke St. and I-95.

- South Van Dorn Street at Eisenhower Avenue in both peak periods -- due to capacity constraints northbound (A.M. peak) at the I-95 and railroad underpass and southbound (P.M. peak) at the underpasses and the ramps from Eisenhower Avenue.

- Edsall Road at South Van Dorn Street in both peak periods -- due to high volumes of through traffic and heavy turning movements.

- North Beauregard Street at Seminary Road in both peak periods -- due to high volumes of through traffic and heavy turning movements.

- King Street at North Beauregard Street in both peak periods -- due to high volumes of through traffic and heavy turning movements.

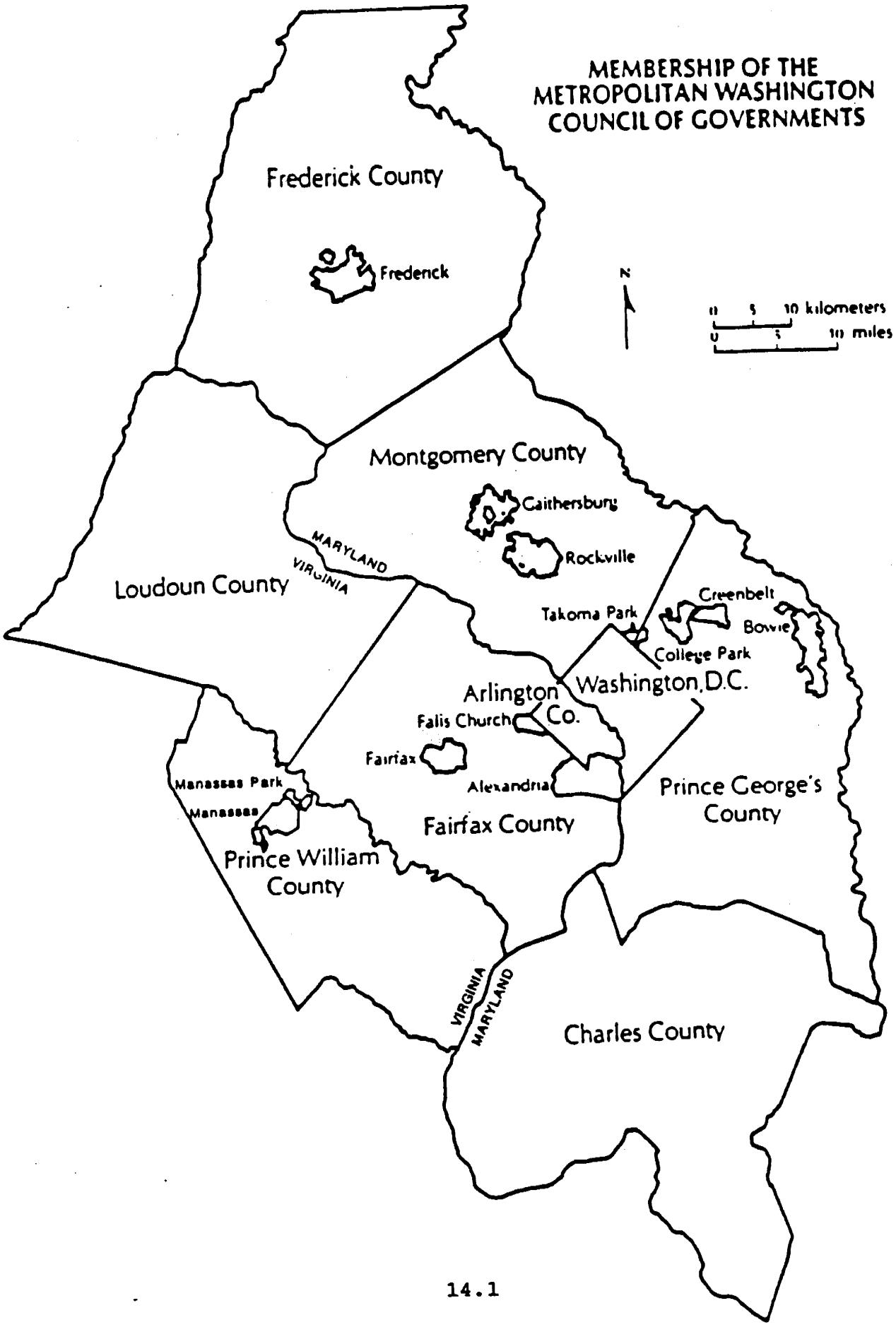
- King Street/Quaker Lane/West Braddock Road intersection in both peak periods -- due to the multiple turning movements and high volumes of traffic traversing the intersection.

- King Street at Russell Road in both peak periods -- due to limited capacity at the underpass and multiple turning movements in the intersections.

- Washington Street/Slaters Lane intersection in both peak periods -- due to capacity constraints in the corridor and heavy turning movements at the intersection.

- King Street at Patrick and Henry Streets in the P.M. peak period -- due to capacity constraints in the corridor and heavy turning movements at various intersections.

Map II-1


MEMBERSHIP OF THE
METROPOLITAN WASHINGTON
COUNCIL OF GOVERNMENTS
Frederick County
Frederick
N
10 kilometers
10 miles
Montgomery County
Gaithersburg
Rockville
MARYLAND
VIRGINIA
Loudoun County
Takoma Park
Greenbelt
Bowie
College Park
Washington, D.C.
Arlington Co.
Falls Church
Fairfax
Alexandria
Manassas Park
Manassas
Fairfax County
Prince George's County
Prince William County
VIRGINIA
MARYLAND
Charles County

B. REGIONAL TRANSPORTATION AGENCIES

The City of Alexandria is an active participant in various regional transportation planning and operational agencies. The following major agencies interact and affect transportation in the City:

1. The Metropolitan Washington Council of Governments (MWCOG)

MWCOG, or COG, is the regional organization of the area's local governments and their government officials. COG coordinates comprehensive planning by many regional, subregional, and local agencies in the Washington metropolitan area (Map II-1).

COG, by reason of its comprehensive areawide planning functions, has been designated by the Federal government as the metropolitan clearinghouse for the Washington metropolitan area. It has the responsibility to review and comment on consistency of proposed Federal-aid projects with areawide policies, goals, and objectives.

Boards and Committees, operating under the umbrella of MWCOG, are of major importance to the City of Alexandria: The National Capital Regional Transportation Planning Board (TPB) and the Chief Administrative Officers (CAO) Committee. The City Mayor is the representative of Alexandria on the TPB Board, and the City Manager on the CAO Committee.

The TPB

The TPB is the organization responsible for conducting the continuing, comprehensive transportation planning process for the Washington metropolitan area in accordance with requirements of the Federal-Aid-Act of 1962, and the Urban Mass Transportation Administration Act of 1964, as amended. The Governors of Maryland and Virginia and the Mayor of the District of Columbia have designated the TPB as the Metropolitan Planning Organization (MPO) for the Washington metropolitan area. The TPB also serves as the transportation policy arm of COG, and administers various specialized transportation committees composed of jurisdictional transportation staff.

The CAO Committee

The CAO Board is composed of CAO's of the various jurisdictions and provides an arena to address common topical issues, including transportation. In recent years, the CAO's Staff has become the primary review committee of the Operating Budget and Capital Improvement Program of the Washington Metropolitan Area Transit Authority (WMATA).

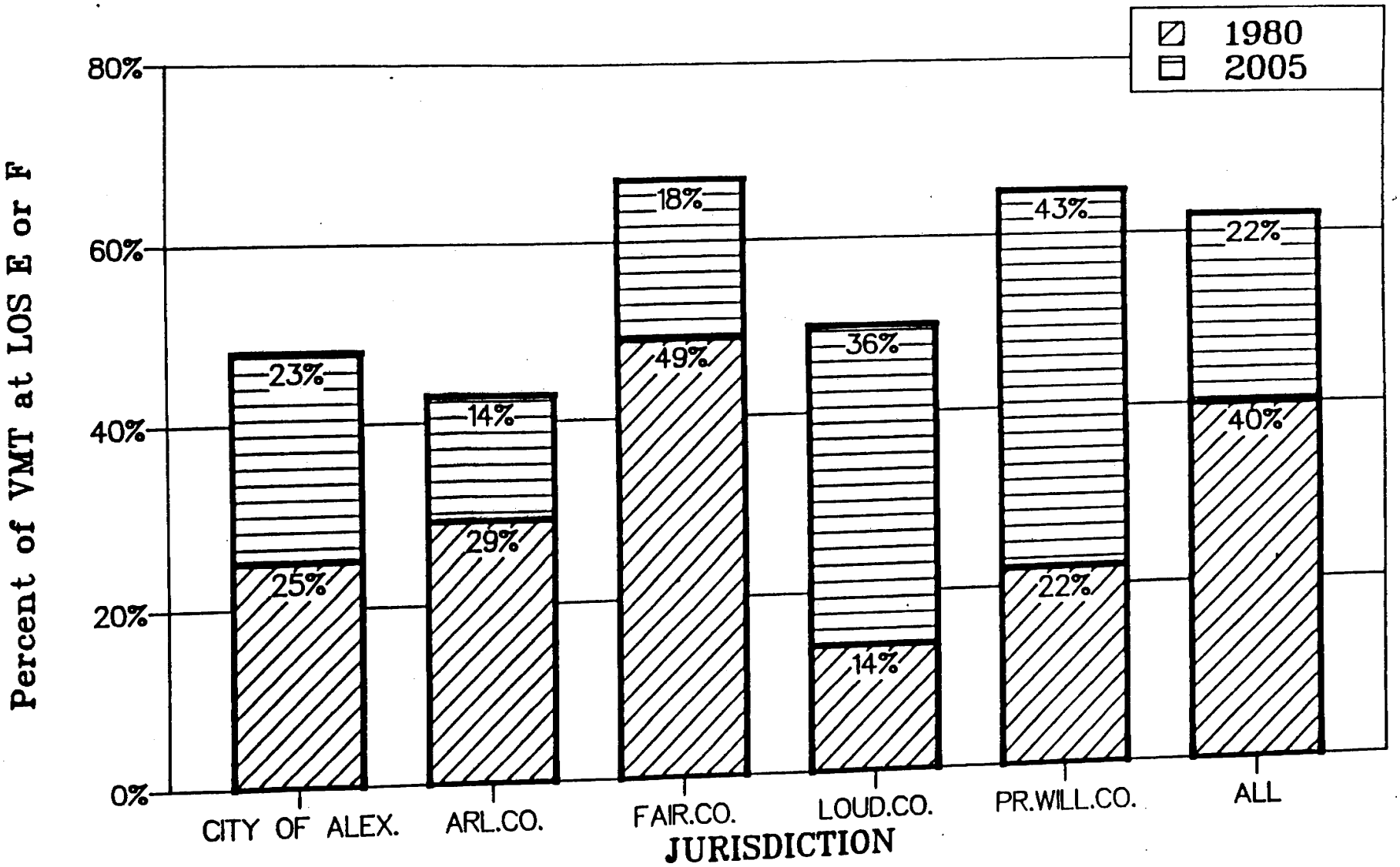
2. The Virginia Department of Transportation (VDOT)

The Virginia Department of Transportation (VDOT) is in charge of transportation planning and construction of State highways and transportation facilities in Northern Virginia. The responsibility for state roads which operate within the City of Alexandria, is divided between VDOT and the City. VDOT provides roadway maintenance funds to the City for arterial, collector, and local streets. Major roadway improvement projects in the City (Duke Street widening, Washington Street improvements at Prince Street) are funded on a cost sharing basis of 98% Federal and State, and 2% City (Duke Street improvements were initiated prior to the recent legislative changes and costs were shared 95%/5%). Improvements to interstate roadways in the City (I-95 and I-395), are funded at 100% Federal and State with no City participation.

The City Council, City staff, and citizens work with four major divisions of the Virginia Department of Transportation.

FIGURE II–5

Percentage of Total Vehicle Miles Traveled (VMT)
Operating at Level of Service E or F : 1980 – 2005



SOURCE : COG – 1986

The VDOT **Transportation Planning Division**, located at the main office in Richmond, reviews City project proposals and is responsible for making recommendations on the projects to the City and the Urban Division. This office is represented on the Washington Metropolitan Area Council of Governments (COG), Transportation Planning Board and Transportation Technical Committee. All federally funded projects must be included, by law, in COG's Transportation Improvement Program (TIP). Alexandria also works with the Transportation Planning Division on regional study committees such as the Washington Bypass Study Committee; the Woodrow Wilson Bridge Improvement Study Committee; the Beltway Steering Committee; the Shirley Highway HOV Study Committee; the Beauregard Street Study, and the Clermont Avenue Study Committee. The Planning Division also administers the street classification process.

The VDOT **Urban Division** administers project planning, design, funding, and the public hearing process, such as the King Street/Beauregard Street project, the King Street underpass improvements, and the Braddock Road underpass improvements.

The VDOT **District Engineer's Office** interacts with the City on transportation issues that concern coordination with other jurisdictions in Northern Virginia such as the Beauregard Corridor Study; the Northern Virginia 2010 Transportation Plan; the I-95 Corridor Study Committee; and the proposed new connections to I-95 from Eisenhower Valley.

The VDOT **Resident Engineer's Office** interacts with the City to coordinate roadway construction projects that affect the City, for example the Duke Street widening and the I-95 bridge repair projects. This office also coordinates City highway maintenance funds which includes annual inspection of City maintenance performance and the qualification of additional roadways for maintenance payments.

3. **The Washington Metropolitan Area Transit Authority (WMATA)**

WMATA, commonly known as Metro, is the regional public transit authority for the Washington metropolitan area, providing both rapid rail and bus service in the District of Columbia; Prince George's and Montgomery Counties in Maryland; and Arlington and Fairfax Counties and the Cities of Alexandria, Fall Church, and Fairfax in Virginia. WMATA serves an area of 1,486 square miles, and a population of 3.9 million.

WMATA was created by interstate compact in 1966. In October, 1967 it assumed responsibility for planning and construction of Metrorail, and in 1976 it began operating the first section. In 1973, WMATA also assumed authority ownership and operation of the area's four, previously private, bus companies. The bus operation became known as Metrobus.

As of 1992, WMATA operates 81.1 miles of Metrorail service and 70 stations. Metrobus operates approximately 1,550 buses in the metropolitan area. Currently, in the City of Alexandria, Metrorail operates over 8 miles and 4 stations. The Alexandria stations are: Braddock Road, King Street, Eisenhower Avenue and Van Dorn Street.

In late 1990, Congress passed legislation (PL 101-551) authorizing funding toward completing the final 13.5 miles of the 103 mile Metrorail system, including extending the Blue line to Franconia-Springfield. The construction of the remaining 9 stations is anticipated to be completed by 2001.

In 1991, Metrorail ridership was approximately 150 million trips, and Metrobus ridership exceeded 140 million, for a systemwide total of 290 million trips. These figures represented no gain in ridership over the prior year, even with the addition of 6 stations on Metrorail. A lagging economy and Metrofare increases have been blamed for the inability to attract new riders on the system.

Despite the systemwide decline, Northern Virginia, including the City of Alexandria, have seen some increases in Metrorail patronage and a maintenance of Metrobus ridership, even with bus service reductions.

Metrobus and Metrorail combined cover approximately 54% of operating costs from the farebox and federal operating assistance. The rail construction costs are divided between federal sources and local match, with the local governments now paying 37.5% of the cost, compared to 20% under the prior Congressional authorization.

The WMATA Operating Budget is approaching $700 million per year. The operating deficit is divided among the member jurisdictions according to formulas related to service density, population, usage, and farebox revenues. In FY 1993 the City will pay WMATA approximately $13.0 million for Operating Subsidy and more than $1.5 million for rail construction and capital replacement. Approximately $9.0 million of this sum will be paid by the Northern Virginia Transportation Commission (NVTC), and the balance from the City's General Fund.

A member of the City Council serves on the WMATA Board of Directors, which sets WMATA's policies and oversees its operations and budget. A City staff person serves on WMATA's Jurisdictional Coordinating Committee (JCC) which coordinates activities at the staff level.

4. The Northern Virginia Transportation Commission (NVTC)

The Northern Virginia Transportation Commission (NVTC) was created by the Virginia General assembly in 1964, and consists of 19 Commissioners. Thirteen are locally elected officials from its six member jurisdictions: Arlington, Fairfax, and Loudoun Counties, and the cities of Alexandria, Fairfax, and Falls Church. Five of the 19 Commissioners are appointed from the Virginia's General Assembly, and one represents the Virginia Department of Transportation.

NVTC provides a policy forum for the region, and is charged with allocating almost $70 million in State and Federal transit assistance each year among the member jurisdictions. NVTC also appoints Virginia's two principal and two alternate members to the Board of Directors of WMATA.

The Commission is a strong advocate of adequate, stable, and reliable funding to finance public transit, with strong support for ridesharing and other effective measures for improved efficiency of the region's transportation systems. The Commission also provides transit to the region in the form of demonstrations of innovative services, such as the commuter rail service, the Virginia Railway Express (VRE), which will provide service from Manassas and Fredericksburg to Washington D.C., starting in the Fall of 1991. Among other, the VRE will have a stop at Alexandria's AMTRAK station, which will be connected to the King Street Metro Station.

The following table shows sources and funding levels at NVTC in FY 1990, and Alexandria's share. Similar distribution has existed in the last years, and is expected to continue in the near future.

II-2

NVTC FUNDING, FY 1990

	NVTC Total	Allocated to Alexandria	% of NVTC Total
State Aid-Capital	$16,800,409	$2,048,902	12.2%
State Aid- Fuel, Tires, Maint.& Adm	36,764,427	6,358,661	17.3%
Gas Tax	11,308,330	1,574,914	13.9%
Federal Aid	4,193,441	739,430	17.6%
Total	$69,066,606	$10,721,907	15.5%

C. TRANSIT SERVICES AND ALTERNATIVE TRANSPORTATION

1. The Alexandria Transit Company-DASH

The Alexandria Transit Company (ATC), commonly known as DASH, operates transit services within areas of the City of Alexandria, and between the City and the Pentagon Metrorail Station. Its purpose is to supplement the regional rail and bus service provided by WMATA with local transit service.

Among the community objectives that the system is designed to support are:

a. Improve internal circulation within the City, particularly in areas not served by Metrobus.

b. Improve access to Metrorail stations.

c. Development of the City's major growth areas.

d. Relief of traffic-congested corridors and the avoidance of alternative expenditures for highway and parking facilities.

e. A decrease in the amounts paid by the City for Metrobus service.

ATC is a non-profit corporation organized under chapter 1, title 13.1 of the Code of Virginia (1950), as amended, for the purpose of providing mass transportation services as a public service corporation. The entire capital stock of the ATC Corporation is owned by the City, and it operates under a seven-member Board of Directors elected annually by the City Council, acting for the sole stockholder.

Operations, under the policy direction of the Board of Directors, are the responsibility of the ATE Management and Service Company, with which the Board has entered into a management agreement. The General Manager is an ATE employee. All other persons engaged in the operation of the transit system are employees of an ATE subsidiary.

The company has 33 buses.

Routes and Service Levels

Alexandria Transit Company (DASH) operates six routes:

AT2. Braddock Road Metro Station to The Hamlets, via Old Town, King Street Metro Station, King Street, Bradlee, and the Alexandria Hospital.

AT3. Old Town to Parkfairfax, via Braddock Road Metro Station, Braddock Road, and Cameron Mills Road, with a peak-period extension to the Pentagon Metro Station on weekdays.

AT4. Hunting Towers to Parkfairfax, via Braddock Road Metro Station, Braddock Road, Russell Road, and Glebe Road, with a peak-period extension to the Pentagon Metro Station on weekdays.

AT5. Braddock Road Metro Station to Landmark, via Old Town, King Street Metro Station, Janneys Lane, and Van Dorn Street.

AT6. Hamlets to Eisenhower Avenue Metro Station, via Beauregard and Duke Streets, Stevenson Avenue, Yaokum Parkway, Edsall Road, Van Dorn Street Metro Station and Eisenhower Avenue. This route is interlined with route AT2.

AT7. Landmark to Van Dorn Street Metro Station, via Holmes Run Parkway and Pickett Street. This route is interlined with route AT5.

A seventh route (AT8) will provide service, effective June 28, 1992, between Old Town and Van Dorn Street Metro Station, via Washington and Duke Streets, King Street Metro Station, Landmark and South Whiting Street.

The routes operate at headways of 20-30 minutes during the A.M. and P.M. peak, and 30-60 minutes off-peak.

ATC carried 1.4 million passengers in fiscal year 1991 and projects 1.86 million passengers in fiscal year 1992. Ridership since the beginning of service on March 11, 1984, is shown in Table II-2. Financial data for the years 1990-1992 are shown in Table B-6.

The 1993 Transit Development Program is based on the following assumptions:

1. Service levels will increase from 850,000 total miles to 1,028,000 total miles, reflecting the new AT8 route.

2. Ridership will increase from 1.5 million passengers to 1.86 million.

3. No fare increase is anticipated during fiscal year 1993.

TABLE II-3

ATC RIDERSHIP

Fiscal Year	Total Passengers	Average Weekday	Saturday	Sunday	Passengers Revenue/Mile	
1984	195,916	2,228	763	278	1.2	16.1
1985	923,405	3,332	1,029	416	1.8	24.6
1986	1,176,091	4,247	1,283	490	2.2	30.3
1987	1,174,597	4,251	1,338	538	2.2	30.6
1988	1,174,470	4,246	1,305	508	2.2	30.1
1989	1,292,787	4,680	1,417	612	2.2	30.4
1990	1,352,503	4,899	1,508	660	2.4	32.0
1991	1,405,662	5,021	1,664	785	2.4	30.8

Source: Alexandria Transit Company

2. Transportation Management Plan (TMP) Ordinance

On May 16, 1987, the City passed an ordinance requiring developers to reduce single occupant vehicle (SOV) traffic from major developments. To comply with the ordinance, developers proposing to build a project meeting the thresholds described below, are required to submit a Transportation Management Plan (TMP) and must apply for a TMP Special Use Permit (SUP) before the project can proceed. Site plans and TMP Special Use Permits applications must be submitted concurrently. The TMP must include a Traffic Impact Study (TIS), and a Transportation Management Plan (TMP).

The TMP requirement is determined by the use and size of the proposed development. The thresholds for individual building and for multi-purpose projects are as follows:

Office:	50,000 or more square feet of usable space.
Retail:	40,000 or more square feet of usable retail space.
Industrial:	150,000 or more square feet of usable industrial space.
Residential:	250 or more dwelling units.
Mixed-Use:	if the building contains any of the uses listed above which meet the size threshold, a TMP is required and must be prepared for the entire project.

The Traffic Impact Study (TIS) assesses the peak traffic impacts of the proposed project with and without a traffic mitigation plan. This serves to determine the extent traffic mitigation measures are needed and to indicate which traffic mitigation measures may be most effective.

The Transportation Management Plan (TMP) is a set of actions to reduce site-associated peak-hour auto traffic. This means reducing the proportion of single occupancy vehicle (SOV) trips, and increasing the use of mass transit, carpools and vanpools during the peak hour, or to spread the number of SOV trips beyond of the peak hour.

The stated goal of the TMP Ordinance, City Ordinance No. 3204, is that the Transportation Management Plan will reduce the amount of traffic the project will generate by 10 to 30 percent.

As of June 1990, 27 projects, totaling over 7,900,000 square feet of office space, 840,000 square feet of retail space, 5,000 residential units, 850 hotel rooms, and 5,000 restaurant seats have been approved, subject to TMPs (Table B-7).

Administration of the Ordinance

The Department of Planning & Community Development (P&CD) and the Department of Transportation & Environmental Services (T&ES) are responsible for administering Ordinance No. 3204.

Prior to application submittal of the TMP, the developer meets with the Directors of P&CD and T&ES to discuss the traffic impact study technical assumptions and the TMP guidelines. The application for a TMP Special-Use-Permit is submitted to P&CD along with the developer's site plan application.

The application is circulated among the responsible staff from each department. P&CD then prepares a Staff Recommendation that goes to the Planning Commission and then to the City Council for final approval.

The Office of Transit Services and Programs, a division of T&ES, has been assigned with the responsibility for administering the TMP from the point where construction nears completion. P&CD continues to provide technical assistance to the office and receives regular feedback and progress reports. P&CD and Transit Services staff meet on a regular basis to discuss and coordinate efforts concerning the TMP projects.

Each project under the TMP ordinance is required to designate a TMP Coordinator following the issue of the Building Permit by the City. The Coordinator is responsible for the management and administration of the ordinance which typically include provisions for:

1) Creation, distribution, display and promotion of transit services and carpooling programs, which may include:

   - o Activities to encourage and assist the formation of car/van pools, such as preferential parking charges and parking locations.
   - o Transit fare subsidies
   - o Provision of bus bays and shelters
   - o Shuttle bus service
   - o Purchase of buses or other transit facilities
   - o Pedestrian Connections to transit.

2) Staggered work time programs to reduce the amount of peak hour traffic.

3) Parking measures which may include parking fee structures tailored to discourage single-occupancy vehicles, prohibition of tenant employer subsidy of parking costs, time and other access restrictions to on-site parking facilities, and programs to support and encourage utilization of alternative transportation modes.

4) A Survey of project employees after 60% occupancy has been established, to determine the number of employees, employee residence, modes of transportation, willingness or ability to use car pooling and/or transit and additional information as the city may require. Such survey is to be conducted annually thereafter, and be submitted as part of the Annual Report.

5) Annual Report including an accounting of activities undertaken in support of the TMP and how funds were expended. The Annual Survey is be part of this report.

3. **The Ridesharing Program**

The City of Alexandria's Office of Transit Services and Programs operates the Alexandria Ridesharing service, supported by an ongoing grant from the Virginia Department of Transportation (VDOT). The goal of the ridesharing program is to reduce the number of work-trips to and from Alexandria which are made by single occupant vehicles by promoting the use of carpooling, vanpooling and transit and by providing advice and information on ridesharing services to individuals and organizations. Program personnel conduct promotions at residential and employment centers to market ridesharing techniques and services, and to register participants in a computerized matching program.

The regional computerized commuter matching service, "RideFinders Network," maintained by the Metropolitan Washington Council of Governments (MWCOG), joins together a computer network of local ridesharing agencies. The agencies in the network share resources and maintain a single common pool of applicants for the purpose of providing the best service to commuters. The City ridesharing program promotes this service with employers, developers and managers of residential and office complexes, and enters the information into the regional data base.

4. **Metrotaxi**

Metrotaxi began in 1987 and offers its patrons discounted taxi rides between 8 p.m. to 12:30 a.m., Monday through Friday, from the Braddock Road or King Street Metrorail Station to any place within the Alexandria City limits. The metered fare is reduced by a $1 or $2 depending on the trips final destination with the difference paid by the City.

Metrotaxi's goal is to assist in completing a Metrorail trip by complimenting DASH and Metrobus service after dark. The program is an outgrowth of an experimental project sponsored by the Northern Virginia Transportation Commission (NVTC). Currently, Alexandria Diamond Cab, Alexandria Yellow Cab, White Top Cab Company, and Alexandria National Cab participate in the program, and between 400 and 500 trips are taken each month.

5. **Specialized Transportation Service - The "DOT" Program**

DOT is the City of Alexandria's specialized transportation service which utilizes taxicabs and wheelchair accessible vans to transport persons who cannot use the regular transit buses because of disabilities. Started in 1985 to complement the City's DASH bus service, the DOT program now serves over 800 citizens and provides approximately 1,700 taxi and 700 van trips per month. Ridership has grown from approximately 10,000 trips in 1986, the first full year of operation, to over 34,000 trips in Fiscal Year 1991.

Any person living in or visiting Alexandria, who has a disability which prevents him or her from using a regular transit bus and who is certified by the Office of Transit Services and Programs, may use the service. A physician's statement is required for the certification.

Both taxicab and van service is offered for trips within the City of Alexandria. The service operates during the same hours as the DASH bus service:

Monday - Friday from 6 am to 11:30 pm
Monday-Friday from 6:00 a.m. to 11:30 p.m.
Saturday from 6:30 am to 11:45 pm
Sunday from 8 am to 9:30 pm.

DOT provides door-to-door service at a fare of $ 1.50 per one-way trip. If assistance is needed, a companion may ride with the DOT rider at no extra cost. The fare will increase to $1.50 on July 1, 1992.

DOT trips are scheduled on an "advance reservation basis" by the volunteers at Senior Citizens Employment Services (SCE&S). However, "Add-On Same Day Service" can be provided if space is available.

The Office of Transit Services and Programs is responsible for administering the DOT program, including planning and promotion of service, and monitoring the contract with the van/taxi service provider. Applications for DOT service are processed by Transit Services and forwarded to Senior Citizens Employment & Services.

6. **Alexandria's Bikeways System**

The City Bikeway system proposal which was adopted by City Council in 1974, has become the backbone of the bikeway network as it is known today.

The principle Guidelines for the Bikeway System are as follows:

a. Place emphasis on trails through parkways and parks for reasons of safety, scenery and pure air.

b. Use existing trails, power lines and railroad easements as well as new and separate right-of-way easements which might follow along existing roadways.

c. Keep cyclists, wherever possible, apart from noise, odor, or hazards of heavy automobile traffic.

d. Traverse a wide area of cityscapes and attractive landscapes.

e. Pass through the Old Town area of Alexandria and afford ready accessibility from a number of automobile parking facilities, e.g. school or institutional parking lots or shopping center lots.

f. Assure access to and provision for security lockers or areas for bike parking at metro stations.

g. Provide interconnection and accessibility to a diversity of recreational and cultural resources and opportunities, e.g., libraries, museums, schools, community centers, nature trails.

h. Afford a sufficiently comprehensive system to permit bicycle trips varying in length from one hour to one or more days, based on the interconnection of the Alexandria system with that of regional trailways.

i. Locate extension and future bikeway proposals to permit service to shopping centers and places of employment, thereby providing an alternative transportation mode.

It is difficult to superimpose a biketrail system on the densely populated area such Alexandria. Therefore, by necessity, most of Alexandria's system runs either on streets or sidewalks rather than as separate trails. The original Master Plan called for fifty-five trail miles; forty-two were to be on-street, and thirteen on separate right-of-ways. The standards used by the City in creating its trails were consistent with those followed by the Maryland National Capitol Parks and Planning Commission, and the Council of Governments. However, Alexandria developed the standards in this area for on street marking of bikeways.

At present, there are approximately 15.5 miles of off-street trails and 19.75 of marked on-street, for a total system of 35.75 miles. The discrepancy between the 55 miles called for in the Master Plan and the 35 miles presently in the system is in the on-street trails. Even though on-street trails will remain a necessary part of any bicycle system in Alexandria, they will always be less desirable than off-street, both for health and safety reasons, as well as for aesthetic ones.

D.THE CITY TRANSPORTATION MODEL

In order to assess the impact of land-use changes and transportation improvements on traffic in Alexandria, the City acquired and developed its own, "in-house," transportation modeling capabilities. In 1987, the City acquired the MicroTRIPS micro-computer transportation model, developed by MVA Systematica, UK. The model became operational in late 1989. This computer model is a micro-computer version of the established transportation modeling methodology developed and refined by the US Department of Transportation since the 1950's, and known as the "Urban Transportation Planning System" (UTPS). In general, this is a "four-steps" sequential model, containing individual modules which estimate:

1. Trip Generation - how many trips will be produced or attracted?
2. Trip Distribution - where will the trips go?
3. Mode split - how will the trips be divided among transportation modes?
4. Route Assignment - which route will the trips take?

Each of the modules listed above is composed of mathematical equations and formulas which simulate and estimate traffic. In addition, the model has capabilities for matrix manipulation, and "on-screen" editing of the transportation network.

The City of Alexandria is located in the middle of a vast metropolitan region. Thus, much of the traffic in the City is "through-traffic," affected by production and attraction in other metropolitan jurisdictions. COG maintains a regional transportation model, which is updated periodically, according to revised plans and projections by its member jurisdictions. However, the COG model, being regional in nature, is not refined enough within the City of Alexandria to estimate impact on individual sites or on more local facilities. To overcome this problem, the City MicroTRIPS model developed a more refined transportation network (Map II-2).

The City model is actually a hybrid. It depends on COG to maintain the extensive and expensive regional data base, and on MicroTRIPS to provide detailed traffic estimates for the City. In essence, the City's MicroTRIPS "zooms in" on the City. An intermediate set of programs developed by the consultant, George Hoyt and Associates, provides a link between COG and the City's MicroTRIPS models.

The transportation model includes a coded network of all major streets in the City and their corresponding characteristics (number of lanes, capacity, speed, parking, etc,.). The model divides the City into homogeneous traffic zones, and estimates the traffic flow among these zones, along the coded network. The MicroTRIPS network includes, in addition to the City itself, sections of Arlington County, and portions of Fairfax County west and south of the City.

The MicroTRIPS model include 330 traffic zones, 152 of which are in the City, and 4,508 one-way links (road segments between intersection). For comparison, the regional, less refined, MWCOG model includes only 60 traffic zones within the City.

Currently, the City model simulates automobile traffic during one hour of the AM Peak. This is the one hour during the AM which has the highest levels of traffic. The COG model simulates a 24-hour period. Thus, the City model extracts from the COG traffic around and onto the City during this one hour, and reassigns it on the refined MicroTRIPS network. The assignment of traffic on the City network is carried out in six iterations. As links (roads) become more congested from one iteration to another, the model assigns the additional trips to alternative routes.

The outputs of the model are traffic volumes and speeds on each link, turning volumes at selected intersections, and eventually the ratios between volume to capacity (V/C) on links and intersection which describe levels-of-service (LOS).

The traffic model is comprehensive. In contrast to Traffic Impact Studies (TIS) which estimate traffic impact only in a vicinity of a single development project, this City model, estimates traffic flow throughout the City.

The City model was calibrated (fine-tuned) with 1985 traffic volume counts to assure that the model simulates correctly existing traffic conditions. The final calibration run simulated correctly within +/- five percent of the 1985 counts.

In 1990 the Transportation Model has been used to estimate traffic impacts of alternative, large-scale, land-use developments. It was used as an analytical tool for the "Cameron Valley Study," by Frederic R. Harris for the "King Street/Eisenhower Avenue Small Area Plan" and for the proposed "Potomac Yard/Potomac Greens" developments. It is anticipate that the City transportation model will become an integral part of the transportation planning process in the coming years.

E. PROBLEMS AND ISSUES

The 2010 Subregional Plan summarized the essence of the regional transportation issues. Future traffic congestion is anticipated to be worse than today's levels on the freeway system in Northern Virginia. To enhance the person moving capability in these corridors, transit and high-occupancy vehicle (HOV) use is important. The use of these modes will be encouraged if they are given priority treatment in congested corridors, thereby saving time that will otherwise be spent in traffic. It has been estimated that these improvements can reduce traffic demand in the major corridors by roughly the equivalent of one freeway lane in each direction.

The emergence of several major employment centers around the Capital Beltway, and along the Dulles, I-66, and Route 28 corridors, points up the need to provide improved transit and HOV access to areas not traditionally served by these modes. Given the congestion anticipated in all of these corridors, it is important to create dedicated rights-of-way for transit and HOV users.

The trend in housing development beyond the Beltway in Northern Virginia is toward low density (less than 1,000 households per square mile in many areas) with neighborhood street patterns that make routing of even small transit buses very difficult. Therefore, to take advantage of a grid for transit and HOV use, a series of park-and-ride lots, strategically located at various points on the grid, will need to be provided to intercept traffic at the earliest opportunity."

The following are the major issues that affect the transportation system in the City of Alexandria:

1. Growth In Regional Traffic. Regional development has the most significant traffic impact on the City with or without development in the City. The surrounding jurisdictions expect to have significant new development by the year 2010. The District of Columbia alone forecasts some 60 million square feet of new development or about 210,000 new jobs by 2010. The growth in the City is small in comparison, representing about 4% of the regional total. There are still large tracts of land available where substantial development is likely to occur. These include Potomac Yard, Potomac Greens, Cameron Station, North Beauregard Street, the Carlyle project, and the remainder of Eisenhower Valley. However, it is anticipated that the City's share of regional office development between 1990 and 2010 is 14 million square feet.

2. Metrorail Extensions and Other Transit Service. In order to divert people from their single-occupant vehicle for their home-to-work trip, they must have a high level of service at a reasonable cost. Transit, either bus or rail or both, must be readily available, convenient, and fast, to compete "better" with the automobile. Extensions of Metrorail service, commuter rail, and expanded bus service are key elements in this formula.

3. High-Occupancy Vehicle Facilities. Diversions to car and van pools will occur if there are adequate available facilities that provide significant incentives to persons who travel by these modes. They must include convenient, remote parking facilities, strategically located with superior access to HOV facilities, and preferred parking facilities at work.

4. Woodrow Wilson Bridge and the Second Potomac River Crossing. The Federal Highway Administration, the State of Maryland, the District of Columbia, and the Commonwealth of Virginia are currently conducting studies which address the serious capacity problems with I-95 and the Wilson Bridge. The solution to these problems will have significant positive impact on the streets in the City.

5. Access to Eisenhower Valley. The three existing access points (south Van Dorn Street, Telegraph Road, and Holland Lane) are inadequate to accommodate normal travel to and from Eisenhower Valley. Emergency vehicle access is seriously lacking. The Clermont Connector study will address improved access from I-95 and Duke Street.

6. Access to Potomac Yard. The magnitude of the development hinges on several key items, one of which is transportation. Transportation access to the site is one of the most critical elements of the plan and to date there has not been a satisfactory resolution of the issue. The site has excellent Metrorail access, but very restricted vehicular access.

7. North Beauregard St./Little River Turnpike Intersection Currently, various development scenarios and road improvements are being analyzed by VDOT. Implementation of improvements at this intersection will greatly enhance access for residents along the North Beauregard Street corridor.

F. ENHANCING THE EXISTING SYSTEM AND NEIGHBORHOOD PROTECTION.

Continuing regional growth and increasing travel demands over the next 20 years will put great pressures on the existing transportation system. As freeways and arterials become more congested, there will be greater potential for shifts of traffic through neighborhoods, particularly during peak commuting hours.

In a densely developed urban area such as Alexandria, the options for increasing the capacity of existing transportation facilities or providing new facilities without impacting existing residential areas are very limited. The City will be faced with the challenge of expanding and enhancing our neighborhood "protection" measures. The following section outlines a number of options and measures that are available to enhance the capacities of existing facilities, optimize their use, and mitigate the impacts of through traffic on neighborhood streets.

1. Freeways, Arterials, and Collectors

As mentioned previously, urban freeways make up less than 10% of the total urban highway mileage, yet they accommodate more than 40% of the traffic. Efficient operation of the controlled access facilities is essential to Alexandria to reduce diversions to our arterial and local street system. Even minor accidents or a disabled vehicle on Shirley Highway or the Wilson Bridge during peak commuting hours can have major impacts on the streets in the City. The Institute of Transportation Engineers estimates that 60% of all freeway congestion is caused by non-recurring incidents. Improving travel flow on the freeways and arterials can effectively serve to reduce congestion, air pollution, energy usage, and diversions of commuter traffic through neighborhoods. The following are approaches that have been applied to freeways and arterials to improve travel flow:

- Incident detection, surveillance, and management systems -- This approach involves roving or standby towing and service vehicles, motorist aid, call boxes, motorist information systems (radio announcements, CB radios, cellular phones), video monitoring of critical locations, pavement detection equipment (to monitor traffic speeds and volume), ramp metering, strict parking control and management on key routes, and a changeable message sign system. These are all elements of the Capital Beltway Improvement Study

- Providing additional capacity without widening -- In some situations on freeways, as on I-95 from Woodbridge to Springfield, the shoulders can be used as travel lanes during the peak commuting hours. Also, reducing lane widths to provide additional lanes may be possible with the existing pavement. The same potential exists on many urban arterials, particularly at intersections.

- Enhanced Arterials -- Many arterial streets have the potential to accommodate additional traffic in a more efficient manner. Some traffic operational improvements which may be possible include:

  - traffic channelization
  - minor street widenings
  - intersection widening
  - left or right-turn lanes
  - two-way turn lanes
  - restricted turns
  - restricted curb cuts
  - grade separation
  - parking restrictions
  - improved signing
  - improved lighting
  - bus bays
  - one-way operation
  - eliminating conflicting vehicular movements

- Traffic Signalization Improvements -- Improvements to an arterial signal system can make significant reductions in congestion by improving the overall traffic flow in a corridor by decreasing travel times. A successful program requires that:

  - the system be flexible enough to meet constantly changing travel demands;
  - the equipment be updated to accommodate more comprehensive time strategies;
  - timing and phasing be monitored and improved as necessary on a continuing basis;
  - interconnection of signals be made where appropriate to provide central control of the network;
  - signals be removed where they are no longer justified and;
  - signal maintenance be conducted on a routine basis and in a responsive manner to emergencies.

- Intersection Improvements -- Traffic control devices and minor improvements can be used at intersections to improve pedestrian safety and the flow of vehicular traffic. Generally, these are relatively low cost improvements involving signs, channelization, islands, and turn lanes.

o High Occupancy Vehicle (HOV) Facilities -- Priority treatments for high occupancy vehicles (HOV's) provide for more effective management of scarce highway space during peak periods by moving more people in fewer vehicles. According to the Institute of Transportation for Engineers, there is substantial savings to motorists who choose to travel to work by car pool or van pool (Table II-4).

TABLE II-4

The Cost To Commute
(per person per month - 1982 dollars)

Distance (miles)	Alone (SOV)	3-Person Carpool	Van 13+Persons	VanPool Driver
30	$165	$55	$45	$0
50	$231	$77	$52	$0

Source: Institute of Transportation Engineers

While the facilities in Alexandria provide some time savings on U.S. Route 1 and Washington Street, they themselves will not cause commuters to car pool or establish van pools. These facilities must be extended to improve their attractiveness. In the metropolitan area, the average commute distance of a car pool is 21 miles. Thus in order to make HOV attractive they should be extended over a long commute distance.

The efficiency of HOV facilities is demonstrated by data from the Shirley Highway facility. The general purpose lanes carry 27,143 persons in 21,792 vehicles (1.25 auto occupancy rate) during the a.m. peak period, 6:30 to 9:30. In the same time period, the express lanes carry 35,460 persons in 4,634 vehicles (7.65 auto occupancy rate)!

o Enforcement -- Strict enforcement of traffic regulations and laws is absolutely essential to the success of freeways and arterials to accommodate their design traffic flows. Motorists who disregard regulations by exceeding speed limits, parking in restricted areas, violating HOV lanes, and blocking intersections contribute to urban congestion. Their negligence leads to accidents and added delays to commuters. Strict enforcement not only penalizes the violators, but also serves as a warning to others that disregard of traffic regulations will not be tolerated.

o Future Technologies -- Several advanced technological programs are under development. These include:

- Advanced Transportation Management Systems (ATMS);
- Advanced Driver Information Systems (ADIS); and
- Automated Vehicle Control (AVC).

Each system is intended to improve the efficiency of the highway transportation network and motorist safety. ATMS involves a coordinated and comprehensive management of all freeways and arterials in designated areas. ADIS is a system which interconnects an individual's vehicle with traffic management centers through a communication link. AVC is a system where a vehicle would be capable of operating in any traffic environment from a programmed origin to a destination without driver intervention. These systems are experimental at this time; however, the horizon for introduction to the general public is within a decade.

2. Neighborhood Protection – Disincentives To Through Traffic

A primary concern, expressed by many Alexandria residents, is the impact of vehicular traffic on their neighborhoods. Commuters through the City should be forced to use the freeways and arterials. They should be discouraged from traveling on local streets that traverse neighborhoods. The City government has taken this position as a stated policy. In many areas of Alexandria, measures have been instituted to discourage or prohibit through-traffic from using streets that interconnect between arterials. Implementation of these measures must be continued as a coordinated effort between City staff and the neighborhoods affected by commuter traffic. Residents must be consulted about the nature of the problem and the proposed mitigation. A thorough investigation and analysis of the through-traffic problem is essential. Public safety is of the utmost importance for the residents and motorists. Some measures may "solve" one problem while creating others that are less tolerable. Many of the measures not only restrict access for commuters but also for the residents and their guests. Any disincentive for commuters would also be an impediment to emergency vehicles (police, fire, and ambulance services), causing delays in response times. To a lesser extent, there may delay for delivery vehicles, refuse collection, and transit. The more restrictive and permanent the disincentive, the greater the impact on the vehicles traveling through the area. All of these factors must be considered when imposing access restrictions. The following is a list of measures that may be considered in neighborhoods where commuter traffic becomes a problem. In general, they are ranked from the least restrictive and least costly to the most restrictive and most costly.

a. Warning Signs and Controls -- Besides speed limit signs, other guide or warning signs may be appropriate to advise motorists of the condition of the street ahead. These may include notice of school crossings, bikeway routes or crossings, curves or hills, stops or yields, a blind intersection, and a dead-end street to name a few. Other conditions may warrant special pavement markings such as cross walks, stop bars, lane delineation to compliment the traffic signs. These measures are used throughout the City in every neighborhood.

b. Signal Timing Restrictions -- Electronic traffic signal equipment offers many options which can assist in limiting commuter traffic from entering neighborhoods. Besides the provision of synchronized signalization along arterial corridors, the controllers can be set to limit the amount of green time allocated to individual vehicular movements. For instance, if left or right turns from an arterial during the peak commuting hours pose problems on a local street, the signal can be set to minimize the green time for those turns. At other times, the controller can be set for normal operation which would provide normal access for the residents and their guests, deliveries, etc. King Street at Russell Road and Callahan Drive is an example of the modified signal timing to minimize through traffic, using Russell Road. Similar operations exist at Duke Street and West Taylor Run Parkway and at Duke Street and North Jordan Street. This is a very flexible measure that can be extremely effective.

c. Restricted Turns -- This measure is used to reduce or eliminate problems created by turning vehicles. Vehicles turning left from arterials may impede smooth traffic flow by blocking a through lane, thus causing some commuters to divert to an adjoining street that may be in a neighborhood. Vehicles may regularly turn right from an arterial onto a local street to avoid congested conditions further on their route. This measure simply involves placement of signs that restrict the problem movement. The restrictions are set for the time period when the problems exist. They may be permanent or only for peak commuting hours. This measure is used throughout the City. However, examples that are primarily set for commuters are located on the crossing streets that intersect Washington Street and on King Street at Rosemont Avenue, and at Cedar Street. These are generally very effective measures, but they sometimes require a high level of enforcement.

d. Parking Controls -- Special residential parking zones, restricted parking, and on-street parking prohibitions can be implemented to eliminate or at least reduce, the impact of commuters entering neighborhoods. If the free parking supply is eliminated , or greatly reduced, the need for commuters to enter a neighborhood is significantly reduced or eliminated. There is a formal process for instituting residential parking zones or for changing the hours of restrictions (interested residents should contact the Transportation Division for information and assistance). All proposed parking restrictions or prohibitions must be reviewed by staff and approved by the Alexandria Traffic and Parking Board. There are currently 9 residential parking districts in the City. These are very effective measures; however, enforcement is essential and it is very labor intensive.

e. Pavement Narrowing -- The geometrics of some streets give motorists the perception of a very wide roadway that is characteristic of higher speeds and higher volumes of traffic. In some instances, the on-street parking lane can be striped to "narrow" the travel lane. Reducing the width from 20 feet to 12 feet with this measure will result in speed reductions and, most importantly, it can reduce the commuters' perception of the street as an arterial-type facility. There are several applications of this measure in the City, including Commonwealth Avenue in Del Ray and West Taylor Run Parkway. The effects thus far appear to be very positive.

f. Pavement Irregularities -- Changes in the street alignment such as curvature or valley gutters tend to cause all vehicles to slow down, possibly making the route less desirable as a cut through. Likewise rough pavement causes vehicles to travel at slower speeds. Valley gutters, depressions in the roadway surface to carry storm drainage, are in place along Mt. Ida Avenue and some crossing streets. While these measures can contribute to speed reduction, they can be very annoying to the adjacent residents because of noise they create when vehicles slow down and cross.

g. Four Way Stops -- Installation of this measure, where safety warrants are met, tends to disrupt smooth traffic flow by requiring vehicles to stop along a route that previously permitted uninterrupted flow. This action reduces the desirability of a street as a regular commuter route. There are numerous locations throughout the City where this measure has been employed: Old Town, Commonwealth Avenue, Taney Avenue, Fort Williams Parkway, Clyde Avenue, Yale Drive, and Cambridge Drive. Studies by the Institute of Transportation Engineers show that there is little overall effect on speed except within a few hundred feet of the intersection. However, the residents of the neighborhoods where there are installations have indicated that they are generally pleased with the results.

h. Traffic Circles -- This is a measure that has not been employed in Virginia because of resistance by State transportation officials. However, in the past two years VDOT has installed traffic circles at a number of existing intersections on an experimental basis. The circles were intended to discourage through traffic from using local streets. Studies in Virginia and elsewhere indicate that traffic volume and speeds are reduced as a result of psychological rather than physical impacts. This measure appears to offer significant potential to reduce through traffic while it has minimal affect on local traffic.

i. Median Barriers, Diverters, and Partial Closings – These measures physically restrict traffic movements that are not desirable. Median barriers are used to improve the arterial flow by reducing conflicting vehicular movements. Diverters and partial closings are used to prevent through traffic from traveling across a neighborhood. These can be very effective measures because they are permanent and require little enforcement.

j. One-Way Streets -- This measure may be used to complement a parallel arterial by providing additional capacity in a corridor which tends to retain through traffic on the arterial or complementary one-way street and out of the adjacent neighborhood. However, this is rarely appropriate in residential areas because no parallel, non-residential facility is available. Another application of this measure is to create a maze of one-way streets to make through travel in a neighborhood difficult. Usually single blocks are designated, making it difficult to find a route that saves time. Unfortunately, this "maze" method is one of the most difficult to obtain neighborhood concurrence.

k. Geometric Designs -- The installation of bulbs, islands, and "chokers" effectively reduce the width of the travel lane, resulting in lower speeds and reducing the desirability of the street as a through route. Islands can be used to channelize traffic, thus eliminating some movements entirely. Bulbs at intersections have been constructed at Duke Street and Fayette Street, on King Street between Royal and Pitt Streets, and on Commonwealth Avenue. Channelization islands have been constructed on Duke Street at West Taylor Run Parkway, at Payne Street, and at Fayette Street. These are effective measures that require periodic enforcement.

l. Street Closures -- This measure may involve closing a street at one end or for the entire length where a problem exists with through traffic. This action requires complete neighborhood concurrence as it physically eliminates vehicular access. Melrose Street at Janneys Lane, and Walnut Street at King Street, are two examples of partial closings.

G. CONTINUING TRANSPORTATION PLANNING PROCESS

There are a number of transportation studies currently underway that have significant influence on travel in the City of Alexandria.

1. Northern Virginia 2010 Transportation Plan.

This study represents a comprehensive transportation plan for Northern Virginia into the first decade of the 21st century. The involvement of State and local elected officials and staffs lends special credibility to the findings as the technical needs are balanced with the political realities of various transportation improvements. The product is intended to set the stage for continuing more detailed analysis and evaluation of the recommendations.

The City Council endorsed the plan as presented with grave reservation because of the lack of a funding plan. Some $10 billion of improvements are forecast by 2010 with only $3 billion in projected revenues. There is no solution proposed to close this gap at this time

2. **Beauregard Street Corridor Study.**

One of the first elements of the 2010 plan to be evaluated will be a traffic corridor study of Beauregard Street, from Little River Turnpike in Fairfax County to Arlington Mill Road in Arlington County. The study was begun in the Summer of 1990 and is scheduled for completion in 12 months. It is intended to assess the needs and to recommend improvements at several major intersections: at King Street (Route 7), at Seminary Road, and at Little River Turnpike (Route 236).

3. **Little River Turnpike/North Beauregard Street Preliminary Design.**

Fairfax County staff has completed preliminary analysis of several alternative designs for traffic improvements to the intersection. Neither the County nor the State have proceeded with implementation of any recommended plan as of this date.

4. **North Beauregard Street/King Street (Route 7) Preliminary Design.**

The Virginia Department of Transportation at the request of City Council has produced several alternative designs for the North Beauregard Street/King Street intersection, including the widening of King Street between the City limits and I-395. Following a staff review, the State was requested to consider several modifications, including a reduction in right-of-way requirements and the location of an interchange between the roadways.

5. **Braddock Road Underpass.**

At the request of City Council, the Virginia Department of Transportation has begun preliminary engineering on improvements to Braddock Road between Mt. Vernon Avenue and West Street at the Metrorail station. Preliminary studies should be completed in 1991. The plans address clearance at the railroad underpass, turning movements at the intersections, vehicular access to the rail station, and pedestrian circulation.

6. **Clermont Avenue Connector and Interchange Environmental Impact Study.**

Virginia Department of Transportation is currently conducting an environmental impact study of a new access point to I-95 and possible connectors between Eisenhower Avenue and Duke Street. This work has been underway since the Spring of 1988 and is scheduled for completion in the Fall of 1990. Several public information meetings have been held, and a citizen/staff/Council task force has met regularly with the consultant and the State to guide the study.

7. **Outer Beltway Study.**

The State of Maryland and the Commonwealth of Virginia have recently completed a study to evaluate alternative corridor alignments for an outer beltway and a new Potomac River crossing. The purpose is to provide some relief to the I-95 corridor in the vicinity of the Washington metropolitan area. The City staff presented testimony at a public hearing in June, supporting the eastern by-pass.

8. **Woodrow Wilson Bridge Study and Design Contest.**

Virginia, Maryland, the District of Columbia and the Federal Highway Administration are considering plans for the renovation or replacement of the I-95 Potomac River crossing.

9. **Capital Beltway Steering Committee**

City staff meets on a regular basis with representatives of VDOT, the State Police, and traffic personnel from other Northern Virginia jurisdictions to discuss problems, solutions, and proposed improvements to the Capital Beltway. The staffs are supported by a professional engineering consulting firm that prepares plans and alternative studies which are considered by the committee. The committee evaluates safety improvements, electronic signing and surveillance, geometric changes, and alterations to ramps and interchanges. A preliminary report was released in the Spring of 1990; however, it has not been finalized as two major elements were not included in the final analysis, i.e., the collector/distributor roadway between the U.S. Route 1 and Telegraph Road interchanges and a flyover ramp from the Telegraph Road interchange to Eisenhower Avenue at Stovall Street.

10. **Alexandria Small Area Plans**

The process for updating the Adopted 1974 Consolidated Master Plan involved the division of the City into 14 sectors to study and evaluate land use and development issues in greater detail. The plans were developed in consultation with citizens, property owners, and community and business groups. Each of the Small Area Plans adopted as elements of the Master Plan covers the subject of streets and highways as it relates to a specific neighborhood.

III. RECOMMENDATIONS

A. INTRODUCTION

Many of the City's transportation problems are generated outside Alexandria and are beyond the direct control of the City. Therefore, the solutions must be formulated and implemented in cooperation with our neighboring jurisdictions. Coordinated policies and programs must evolve through regional discussion and continued, active participation with the Washington Metropolitan Area Transit Authority, the Northern Virginia Transportation Commission, and the Northern Virginia Planning District Commission. The City should take every opportunity to reinforce the spirit of regional cooperation among the jurisdictions in solving our transportation problems. A number of the recommendations focus on policies and programs that address these regional issues.

Additional investment in Metrorail extensions, institution of commuter rail from the south and west, and expanded Metrobus and DASH services are necessary to attract riders away from their automobiles. These facilities are to be supplemented by the development of a regional HOV grid network which offers the potential to reduce the number of work-trips by single-occupant vehicles.

Nevertheless, streets and highways will continue to be an essential part of a comprehensive transportation plan for Alexandria. Each recommended improvement has been considered in the context of its compatibility with adjacent land uses, its effect on residential uses, and its ability to improve service, efficiency, and safety. The recommendations are presented in four categories. The improvements within each category, are not ranked in order of priority. However, the projected time frame for the implementation is listed in parentheses. Overall, the list identifies the transportation needs during the study period, extending to the year 2010. The categories are:

- General Policies and Strategies
- Streets and Highways
- High Occupancy Vehicle Facilities
- Transit
- Bikeways

Many factors affect implementation of a project. It is conceivable that some of the improvements anticipated in the short term, 1 to 5 years, will not be completed in that time frame due to funding limitations or changes in priorities. It is also probable that long-term projects of 10 to 20 years, could be completed sooner. The recommendations should serve as a guideline for future needs rather than to dictate the future. Changes in land uses inside and outside the City necessitate a flexible Plan. The recommendations of the Master Transportation Plan are shown on Map III-1.

B. GENERAL POLICIES AND STRATEGIES

The following are general guidelines for transportation policies and strategies in the City:

1. Encourage and support expanded commuter parking facilities outside the Capital Beltway, at Metrorail stations, and in locations served by bus and accessible to HOV facilities.

2. Continue to support, fund, and upgrade pedestrian facilities throughout the City, particularly along thoroughfares, Metro access routes, and pedestrian corridors. Sidewalks should be provided on both sides of all streets, recognizing that topography can limit their placement and alignment.

3. Continue to support and fund traffic signal and intersection improvements throughout the City. Emphasis should be placed on low-cost upgrading of existing facilities to improve traffic flow and traffic safety. Special emphasis should be on improvements and upgrading of the computerized signal network.

4. Continue to provide a balanced signal phasing to accommodate the heavy north/south commuting traffic and the east/west movement.

5. Continue to encourage mixed uses in new developments to minimize the number of highway-based work trips.

6. Continue the TMP process to maximize transit, HOV, bike, and pedestrian work trips.

7. Continue to support and fund the completion of the biketrail network throughout the City and encourage connections to trails in adjoining jurisdictions. In particular, provide a connection from the Eisenhower/Holmes Run Trail to Clermont Avenue and Fairfax County.

8. Continue the City-wide program to remove obstructions to the physically handicapped in the public rights-of-way, including provision of pedestrian ramps at corners, and audible warning devices at signalized intersections.

9. Continue implementation of the Peat, Marwick's and Main's "CBD Parking Study" recommendations, including acquisition of the Queen/Lee Street lot, and the construction of parking garages, as demand warrants, at this site and at the Cameron/Columbus location.

10. Explore in concert with the Chamber of Commerce and the Old Town Business Association, the possibilities of providing a comprehensive graphic program to better inform visitors of parking locations in Old Town.

11. As a general rule, require that any on-street parking lost due to development be replaced by the developer.

C. STREETS AND HIGHWAYS

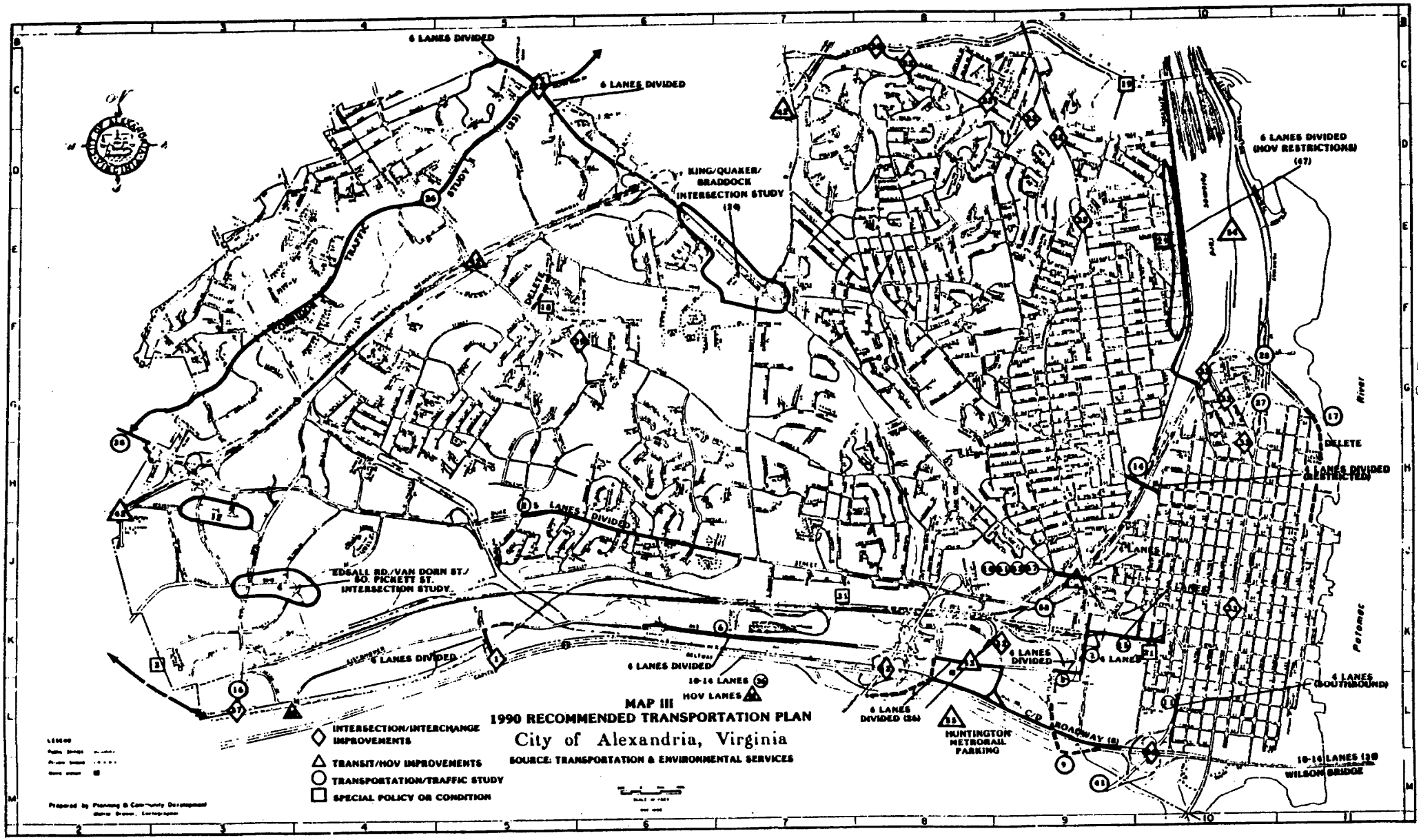
The following are recommendations for studies and implementation of road improvements in the City and its surroundings:

1. Clermont Interchange with I-95 and the connection to Eisenhower Avenue. (1-5 years).

   This project is currently being studied by the Virginia Department of Transportation for the City of Alexandria. The draft Environmental Impact Statement is scheduled for release in the Fall of 1990. The City Council recognized the critical need for improved access to the Eisenhower Valley and requested that the State investigate a connection between I-95 (the Capital Beltway) and Eisenhower Avenue. This interchange and the connecting roadways will improve access to the Cameron Valley and the Eisenhower Corridor. The City Council has indicated to VDOT their support of the interchange. (King St./Eisenhower Ave. Metro Station Small Area Plan).

2. Duke Street (Route 236) from Wheeler Avenue to Jordan Street. (beyond 5 years)

   It is recommended that a fifth lane be considered to accommodate safe left turns to adjacent residences and businesses along Duke Street. Raised medians should be used at various locations to protect left turning vehicles, to restrict some turning movements, and to provide pedestrian refuge when crossing this arterial.



MAP III

1990 RECOMMENDED TRANSPORTATION PLAN

City of Alexandria, Virginia

SOURCE: TRANSPORTATION & ENVIRONMENTAL SERVICES

3. Edsall Road Connector to Farrington Avenue and South Pickett Street, (beyond 5 years)

It is recommended that a new roadway be considered along the Fairfax County line to connect Edsall Road, South Pickett Street, and Farrington Avenue to relieve sections of South Van Dorn Street and to provide direct access to the Eisenhower Avenue corridor and the Van Dorn Street Metrorail Station. Although discussions with Fairfax County officials have not been fruitful to this point, the option should not be abandoned entirely and should be reconsidered at a later date.

4. Edsall Road from Van Dorn Street to South Pickett Street, (1-5 years)

It is recommended that a traffic study be conducted for this section of roadway to determine improvements for the corridor to relieve congestion at the two intersections, including consideration of a grade separation at Edsall Road and Van Dorn Street.

5. Eisenhower Avenue from Hooff's Run Drive to Holland Lane, (1-5 years)

It is recommended that this section of roadway be improved to a four-lane, divided highway with a raised median and protected left turn lanes. This link will connect existing four-lane Eisenhower Avenue with an upgraded Holland Lane. It is anticipated that 100% of the cost of the improvements will be absorbed by developers of the Carlyle project. (King Street/Eisenhower Avenue Metro Station Small Area Plan).

6. Eisenhower Avenue from Bluestone Road to Mill Road, (1-5 years)

It is recommended that this section of roadway be improved to a four-lane, divided roadway with a raised median and protected left turn lanes. The upgrading of this link will complete Eisenhower Avenue in the center of the corridor.

7. Holland Lane from Duke Street to Eisenhower Avenue, (1-5 years)

It is recommended that this roadway be widened to four lanes. It will improve accessibility to the adjacent development and improve access between two major arterials. The cost of the widening will be absorbed by developers of the Carlyle project. (King Street/Eisenhower Avenue Metro Station Small Area Plan).

8. Interstate-95 Service Road Between U.S. Route 1 and Telegraph Road With Connections To Mill Road, (1-5 years)

It is recommended that a two-lane service road be provided along the north side of I-95 to improve access to Eisenhower Valley between the U.S. Route 1 and Telegraph Road interchanges. Additional access ramps to the valley from the Beltway at Mill Road will absorb a significant portion of traffic destined to the developments in the corridor and will relieve some of the congestion at the interchanges and along U.S. Route 1 and on Duke Street. Although this will be an Interstate Highway System project, requiring no funding from the City, the project may be funded by developers in the valley to accelerate construction and is a requirement of the Carlyle project. The City Council has indicated to VDOT their desire to have this access provided to the Valley (King Street/Eisenhower Avenue Metro Station Small Area Plan).

9. Connection from Eisenhower Valley to the Eastbound Beltway (I-95) (beyond 5-years)

It has been suggested that a roadway connection be provided from the east end of Eisenhower Valley to northbound I-95. Although the options for construction are very limited and very costly, it is recommended that the connection be studied by the State as part of the proposed improvements to the Beltway and the Wilson Bridge.

10. King Street from Russell Road to Daingerfield Road (beyond 5 years).

Originally, the proposed widening of King Street at the railroad underpass included a new overpass to increase clearance, three inbound lanes on the existing alignment, and two outbound lanes on a new alignment. The City Council voted to postpone final design and construction until at least FY 1994. The widening is estimated to cost more than $9,000,000 and is an Urban Highway System project. The City's portion of construction is expected to be 5% as approval was obtained prior to the State law change to 2% in 1989.

It is recommended that the City proceed with a four-lane roadway design project at this location and that it indicate a separate pedestrian access point to the rail station at the north end of the platform adjacent to Commonwealth Avenue. The proposed placement of the station entrance would allow access to Metrorail from the Rosemont area without pedestrians having to cross Commonwealth Avenue or King Street.

11. Patrick Street (U.S. Route 1) southbound from Franklin Street to the I-95 ramps. (1-5 years)

It is recommended that an additional southbound lane be constructed on this approach to the I-95 interchange to facilitate access, particularly during the afternoon peak period.

12. Stevenson Avenue from South Van Dorn Street to South Yoakum Parkway. (1-5 years)

It is recommended that intersection improvements be made in this corridor to facilitate turning movements and through traffic, particularly at the South Walker Street and South Whiting Street intersections. A portion of the cost of these improvements would be absorbed by the developer of the adjacent property.

13. Telegraph Road Interchange at I-95. (beyond 5 years)

It is recommended that an additional ramp connection be provided from the eastbound I-95 to northbound Telegraph Road ramp to intersect Eisenhower Avenue at Stovall Street. In addition, a ramp should be provided from Telegraph Road near Huntington Avenue connecting with the extended ramp to Eisenhower Avenue. These additions to the interchange will provide direct access to Eisenhower Avenue from eastbound I-95 and northbound Telegraph Road in Fairfax County without traffic passing through the already congested Telegraph Road/Pershing Avenue intersection. The City Council has indicated to VDOT their desire to have this project constructed. (King Street/Eisenhower Avenue metro Station Small Area Plan).

Although this is an Interstate Highway System program that requires no City participation, the City may ask developers in the valley to contribute to the construction to accelerate the project.

14. East Braddock Road from Mount Vernon Avenue to West Street, (1-5 years)

The Virginia Department of Transportation has begun engineering design of street improvements in this section of roadway. The City Council, by resolution, requested a project be programmed by the State. The proposed improvements in the Braddock Road Metro Station area include greater clearance at the railroad underpass, provision of wide sidewalks to enhance pedestrian access (10-foot minimum width), channelization of turning movements, a median to provide a pedestrian refuge, and to improve the roadway alignment at the east end of the project. Through truck traffic will not be permitted to use this route. (Braddock Road Metro Station Small Area Plan).

15. Wolfe Street from Holland Lane to South Fayette Street, (beyond 5 years)

It is recommended that Wolfe Street be constructed as a two lane facility with sidewalks and a bike trail between Holland Lane and Fayette Street. This roadway will enhance access to the abutting properties while improving access to Holland Lane. It will also function to relieve some congestion along Duke Street. Wolfe Street shall not connect for vehicular access through to U.S. Route 1 (King Street/Eisenhower Avenue Metro Station and Southwest Quadrant Small Area Plans).

It is anticipated that a portion of the roadway will be constructed with funds from developers in the vicinity and served by the new street.

16. South Van Dorn Street Improvements at the City Limits (1-5 years)

It is recommended that one additional lane be added to the southbound roadway from the Metrorail access ramp to the I-95 interchange. also, one additional lane should be added to the northbound roadway from the I-95 interchange to the Metro access ramp. This action will provide improved access to and from the Van Dorn Metrorail Station and the Eisenhower Valley.

17. Delete the North Lee Street Connector

It is recommended that the proposed North Lee Street connector from Pendleton Street to Bashford Lane be deleted. (Old Town North Small Area Plan).

18. Delete the North Pickett Street Connector

It is recommended that the proposed North Pickett Street connector from Seminary Road to West Braddock Road be deleted (Seminary Hill/Strawberry Hill Small Area Plan) as well as any connection of Pickett Street creating a thoroughfare to Duke Street.

19. Commonwealth Avenue Connector at Four Mile Run

"It is the policy of the City that Commonwealth Avenue shall not extend any further than Four Mile Run and shall never be used as a highway leading to Arlington County." (Potomac West Small Area Plan).

20. Eisenhower Avenue Improvements From Stovall Street to Mill Road (1-5 years)

It is recommended that Eisenhower Avenue be widened to six lanes from Stovall Street to Mill Road in the vicinity of the Metrorail station. This action will improve vehicular circulation in the vicinity of the rail station and the area with potential for high density office development. (King Street Eisenhower Avenue Metro Station Small Area Plan).

21. Vehicular Access from Duke Street to Wolfe Street and Wilkes Street

The 300 block of South Payne shall not connect with the 500 block and the 200 block of South Fayette Street shall not connect with the 500 block. This action is intended to prevent vehicular access between the Southwest Quadrant neighborhood and Duke Street or the Eisenhower Valley. (Southwest Quadrant Small Area Plan).

22. Prohibit Eisenhower Avenue from Connecting to U.S. Route 1

Eisenhower Avenue shall not connect through to U.S. Route 1 to permit vehicular access through the Southwest Quadrant. (Southwest Quadrant Small Area Plan).

23. King Street at Beauregard Street (1-5 years)

The Virginia Department of Transportation has initiated a comprehensive traffic study of the Beauregard Street Corridor from Little River Turnpike to Four Mile Run. The King Street intersection will be evaluated in detail at that time to determine the requirements of this location in 2010. There are several preliminary engineering layouts that the State has produced at this time, both grade separated and at grade, but there can be no final determination until the traffic data from the corridor study is available. It is anticipated that a grade separation will be the most beneficial improvement for traffic movement, considering the high volume of turning movements.

The final design for the intersection will include a realignment and widening of portions of King Street from the City limits near Dawes Avenue to the I-395 interchange. (Alexandria West Small Area Plan).

24. King Street/Quaker Lane/West Braddock Road Intersection, (beyond 1995)

It is recommended that a detailed traffic analysis and evaluation be made at this intersection to determine the best approach to improving traffic flow and accommodating the turning movements. The study should extend west along King Street to North Menokin Drive to include the access to Bradlee Shopping Center and the service road and along West Braddock Road to Marlee Way (North Ridge/Rosemont and Fairlington/Bradlee Small Area Plans). Attention must also be paid to pedestrian access and safety throughout the entire study area.

25. Mt. Vernon Avenue at East/West Glebe Road, (1-5 years)

It is recommended that traffic improvements be implemented at this intersection, including signalization, channelization for turning movements, and accommodations for pedestrians.

26. Seminary Road at Beauregard Street, (beyond 5 years)

This intersection will be evaluated as part of the Beauregard Street Corridor Study by VDOT to begin in the Spring of 1991. The study will analyze the operation of the intersection for the design year of 2010 to determine the extent of the improvements. (Alexandria West Small Area Plan).

27. North Washington Street at Bashford Lane, (beyond 5 years)

It is recommended that a traffic study be conducted for this location. This is a very complicated intersection with the multiple vehicular movements on the main roadways and the two service roads, East and West Abingdon Drive. Improved signalization, channelization of vehicular movements, and accommodations for pedestrians need to be evaluated.

28. North Washington Street at Slaters Lane, (beyond 5 years)

It is recommended that a comprehensive traffic study be conducted at this location. This also is an intersection with very complicated movements, particularly with the service roads very near the main roadways. It is anticipated that the intersection will serve as a primary access point to the Parkway from the development in Potomac Yard. The study should be conducted in the context of future development impacts.

29. Potomac West Access to U.S. Route 1

As plans are developed for the Potomac Yard, access along U.S. Route 1 from Monroe Avenue to Four Mile Run should be planned to limit the vehicular impacts on the adjacent neighborhoods by reducing the number of access points along U.S. Route 1.

30. Improvements to the Intersection of I-395, South Glebe Road, and West Glebe Road (1-5 years)

It is recommended that improvements be made at this intersection to increase the capacity of the I-395 ramp to South Glebe Road. This project would involve a relocation of the bridge crossing of Four Mile Run at West Glebe Road. The action would improve the capacity of the intersection to accommodate additional traffic in the South Glebe Road corridor.

31. R.F.&P. Railroad Right-of-way (Potomac Yard to Clermont Ave)

As Potomac Yard develops and the existing rail lines are consolidated, the residual right-of-way should be retained for future transportation use.

32. I-95 Ramp Connection from Mill Road (1-5 years)

It is recommended that a ramp connection be made west of the Telegraph Road interchange with I-95 between Mill Road and the westbound ramp. This will provide direct access from the Valley west of Telegraph Road to the westbound Beltway without entering Telegraph Road.

33. Additional Improvements

There are a number of miscellaneous intersections throughout the City that may need signalization upgrading, channelization, or other improvements to enhance public safety, vehicular access, or pedestrian movements. Some have been requested by civic associations and others identified by the staff for study and upgrading. The additional intersections are:

- Powhatan Street at Bernard Street (1-5 years).
- Tennessee Avenue at Old Dominion Boulevard (1-5 years).
- Powhatan Street at Bashford Lane (1-5 years).
- Powhatan Street at North Columbus Street (1-5 years)
- Seminary Road at North Howard Street (1-5 years).
- Mt. Vernon Avenue at Commonwealth Avenue (beyond 5 years).
- West Glebe Road at Valley Drive (beyond 5 years).
- Beauregard Street at Lincolnia Road (1-5 years).
- Beauregard Street at Quantrell Avenue (1-5 years).
- Old Dominion Boulevard at West Glebe Road (1-5 years).
- Russell Road at West Glebe Road (1-5 years).
- Washington Street at Prince Street (1-5 years).
- Mill Road at Jamison Street (1-5 years).
- South Van Dorn Street at South Pickett Street (1-5 years.

34. Second Potomac River Crossing, and Construction of an Outer Beltway, (beyond 5 years)

It is recommended that the City continue to actively support an eastern bypass route with a new southern crossing of the Potomac River. It is estimated that more than 10% of the peak period traffic on I-95 along the Beltway has an origin or destination outside the Washington metropolitan area. Diversion of this traffic could ease congestion on the Beltway and on many streets in the City. A preliminary study is currently underway jointly by the State of Maryland and the Commonwealth of Virginia. It is anticipated that it will be completed in 1990. City Council has indicated to VDOT their support of this alternative.

35. Woodrow Wilson Bridge Widening, (beyond 5 years)

It is recommended that the City continue to support the regional efforts to add capacity to the Wilson Bridge and the approaches. The State of Maryland, the Commonwealth of Virginia, and the District of Columbia have initiated an environmental impact statement of various improvements for the facility as a result of a design "contest" among bridge engineering firms.

36. Capital Beltway Widening (beyond 5 years)

VDOT has proposed widening the Capital Beltway from its present eight-lane configuration to a fourteen design. There have been discussions of HOV lanes and other transit amenities. It is recommended that the City continue its active role in this planning process.

37. Van Dorn Street Interchange at I-95, (beyond 5 years)

It is recommended that the City support the upgrading and realignment of this interchange to improve access to South Van Dorn Street, the Metrorail station, and Eisenhower Avenue. Fairfax County staff has developed several alternatives, each of which improves the operation of the interchange significantly. At this time, there is no local funding for the project, and VDOT has not programmed a project at this location.

38. Little River Turnpike (Route 236) at North Beauregard Street, (beyond 5 years).

It is recommended that the City support improvements to this intersection that facilitate access from Beauregard Street to I-395. Fairfax County staff has developed several alternatives, but none has been selected at this time. No local funding has been identified nor has VDOT programmed a project at this location.

39. Springfield Bypass (Fairfax County Parkway) (beyond 5 years)

It is recommended that the City support implementation of this cross-county connector to improve access to the Franconia/Springfield Metrorail Station and reduce traffic impacts on 1-95 and Duke Street. Local funding is not currently available and VDOT does not have a complete project programmed.

D. HIGH OCCUPANCY VEHICLE FACILITIES

40. U.S. Route 1 (South Patrick Street) Widening at I-95 (beyond 5 years)

It is recommended that the City support a widening of the U.S. Route 1 overpass of I-95 as part of the Beltway widening program. However, the City should not permit the U.S. Route 1 widening to proceed until there are absolute guarantees that the HOV lanes will extend to Belvoir via U.S. Route 1 and that one lane in the peak direction be restricted to HOV use.

41. HOV Lane Extension to Belvoir (1-5 years)

Support the provision of HOV lanes, on U.S. Route 1 from Fort Belvoir to Franklin Street. The bridge over I-95 must be widened to accommodate the additional "diamond" lanes and some transition widening will be required between the interchange and Franklin Street.

42. HOV Connections on I-395 (1-5 years)

Continue to pursue the construction of connections from the HOV lanes on I-395 to and from the south at Duke Street, Seminary Road, and Shirlington to enhance the attractiveness of HOV's into the City.

43. HOV Extensions to Stafford County on I-95 (1-5 years)

Continue active support of an extension of the HOV lanes on I-95/I-395 to the Prince William/Stafford County line.

44. HOV Lanes on the Beltway (beyond 5 years)

Support the provision of HOV lanes on the Capital Beltway from the Dulles Toll Road to U.S. Route 1 with connections to the HOV lanes on Route 1. Further consideration should be given to extending HOV lanes over the Wilson Bridge to Maryland as part of the design for expanded capacity. Consideration should also be given to HOV connections from the Beltway to the interchanges that serve the City.

45. HOV Extensions on I-66 (beyond 5 years).

Support the extension of the HOV lanes on I-66 from I-495 to Centreville and Gainesville.

46. HOV Extensions on the Dulles Toll Road (beyond 5 years)

Support the extension of HOV lanes on the Dulles Toll Road from Leesburg to I-495.

47. HOV Lane on Braddock Road in Fairfax (beyond 5 years)

Support the provision of HOV lanes on Braddock Road in Fairfax County from Route 123 to I-495.

E. TRANSIT

48. Improved Metrobus and DASH Service

Continue to provide improvements and additional DASH and Metrobus service as demand warrants, connecting residential and employment centers, and Metrorail stations.

49. Bus Shelter Program

Continue the bus shelter program for transit riders at heavy boarding points.

50. Transit Incentives

Continue to require and encourage employers to provide transit incentives for their employees.

51. King Street Station Extension

Continue to explore with WMATA and the Virginia Department of Transportation the provision of an additional access point at the King Street Station near the intersection of Cameron Street and Commonwealth Avenue. This would provide a direct pedestrian connection from the Rosemont area without crossing Commonwealth Avenue or King Street and eliminate many conflicting movements.

52. King Street Station Beautification Plan

Continue support of the King Street Metrorail Station renovation plan, including landscaping, improved vehicular pedestrian circulation and parking facilities.

53. Eisenhower Avenue Metrorail Station Extension

It is recommended that an entrance be provided north of Eisenhower Avenue as development occurs to provide direct pedestrian access to the station without crossing at street level.

54. Potomac Metrorail Station

As part of the development plans for Potomac Yard and/or Potomac Greens, a new metrorail station must be included to ensure high transit usage from land uses that generate significant numbers of work trips.

55. Huntington Metrorail Station

As part of the review of the Potomac Yard and Potomac Greens projects, consideration should be given to requiring additional parking being provided at this rail station to serve these developments.

56. Commuter Rail -- Virginia Railway Express

Continue to fund and support the commuter rail service in Northern Virginia. Explore possibilities of further extensions on these lines to serve greater numbers of commuters.

57. King Street Metrorail/Commuter Rail Connection (1-5 years)

Provide a smooth pedestrian connection between the two rail stations to promote usage of both systems.

58. Pedestrian Grade Separation of Duke Street at the King Street Station (beyond 5 years)

A grade-separated pedestrian crossing of Duke Street will be provided if the City determines that it is needed as development occurs on the Carlyle site. Periodic evaluation of the need would be made as occupancies of significant developments occur.

59. Metrorail Extension to Springfield

Continue active support of the Metrorail extension from the Van Dorn Station to Franconia/Springfield.

60. Completion of the Metrorail System

Support completion of the full 103-mile Metrorail system, including the Yellow Line to Greenbelt, Maryland.

61. Future Metrorail Extensions

Support the study of a future extension of Metrorail service south from the Franconia/Springfield Station to Lorton (Yellow Line) and Belvoir and a future extension of Metrorail service from Vienna to Centreville along I-66 (orange Line).

Bikeway Proposals

62. Cameron Valley Trail Extension

It is recommended that the trail serving Cameron Valley be extended along an exclusive right-of-way from the Eisenhower Avenue/Mill Road intersection to Hooffs Run, under I-95 at the Cameron Run Bridge, and along Hunting Creek to the Mt. Vernon Trail near Porto Vecchio. (King Street/Eisenhower Avenue Metro Station Small Area Plan).

63. Wolfe Street Connector

It is recommended that a bike trail connection be provided along the Wolfe Street right-of-way from Holland Lane to South Henry Street. The rail yards have been abandoned in preparation for the Carlyle development and Wolfe Street is to be constructed for vehicular traffic from Holland Lane to Hooffs Run. (King Street/Eisenhower Avenue Metro Station Small Area Plan).

64. King Street/Braddock Road Rail Station Connection

It is recommended that a bike and pedestrian connection be provided between the two rail stations along the Metro right-of-way. The facility would begin in the vicinity of Cameron Street and Buchanan Street connecting with East Braddock Road near the station.

65. Clermont Bike Trail

It is recommended that a bike trail connection be provided with the Clermont Interchange project. This action will serve to link the Holmes Run Trail with the Fairfax County system. the County board members and staff have been very receptive to this proposal.

66. Hammond/Chinquapin Trail

It is recommended that an off-street link be provided between Duke Street and King Street connecting Hammond Park with Chinquapin Park.

APPENDIX A

FUNCTIONAL CLASSIFICATION CHANGES

APPENDIX A

Functional Classification Changes to the 1974 Major Thoroughfare Plan

STREET SEGMENT	DESIGNATION OLD	NEW	COMMENTS
1. G.W. Mem. Parkway Slater's Lane to N. City Limits	Arterial	Expressway	All access is controlled or limited
2. Holland Lane Duke St. to Eisenhower Ave.	Local	Arterial	Major access to Eisenhower Valley
3. Gibbon Street Washington St. to Patrick St.	Local	Arterial	Westbound access between two arterials
4. Edsall Road Western City limits to S. Pickett	Primary Collector	Arterial	High volume connector between I-395 and Pickett St.
5. Van Dorn Street Duke St. to Menokin Dr.	Primary Collector	Arterial	Major connecting route between Rtes. 236 and 7
6. Menokin Drive West St. to King St.	Local	Arterial	Major connecting route between Rtes. 236 and 7
7. Slater's Lane Washington St. to Monroe Ave.	Local	Primary Collector	Provides key access between U.S. 1 and Washington St.
8. West Street Madison St. to Wythe St.	Local	Primary Collector	Provides access to the Braddock Metro Station
9. West Street Duke St. to King St.	Local	Primary Collector	Connecting route between Duke St. and the Braddock Road Metrorail Station
10. Madison Street Henry St. to West St.	Local	Primary	Provides access to the Braddock Metro Station
11. Wythe Street Fairfax St. to West St.	Local	Primary Collector	Provides access between U.S. 1 and Washington St. and Braddock Metro Station
12. Fairfax St. Pendleton St. to Third St.	Local	Primary Collector	Serves as access to north waterfront area
13. Third Street Fairfax St. to Royal St.	Local	Primary Collector	Serves as access to north waterfront area

14. Royal Street Third St. to Bashford Lane	Local	Primary Collector	Serves as access to north waterfront area
15. Bashford Lane Royal St. to G.W. Memorial Pkwy.	Local	Primary Collector	Serves as access to north waterfront area
16. E. Braddock Road Commonwealth Ave. to West St.	Arterial	Primary Collector	Same characteristics as the remainder of the street
17. Daingerfield Road King St. to Duke St.	Local	Primary Collector	Major access between King St. and Duke St.
18. Mill Road Eisenhower Ave. to Public Safety Bldg.	Not in plan	Primary Collector	Serves Public Safety Building and new development
19. Mill Road West of Telegraph Rd.	Not in Plan	Primary Collector	Serves new development and connects Eisenhower Ave. with Telegraph Rd.
20. Quantrell Avenue I-395 to Beauregard St.	Arterial	Primary Collector	Functions as a Primary Collector
21. Lincolnia Road Quantrell Ave. to Beauregard St.	Local	Primary Collector	Connects Quantrell Ave. with Beauregard St.
22. South Walker Street Stevenson Ave. to Duke St.	Local	Primary Collector	Major connector between Duke St. and Stevenson Ave.
23. South Pickett Street Duke St. to City Limits	Local	Primary Collector	Major connector between Duke St. Van Dorn St. and the City limits
24. Powhatan Street Slaters Lane to Washington St.	Primary Collector	Residential Collector	Redesign of the Monroe Ave. Bridge has deemphasized this facility
25. Oronoco Street N. Columbus St. to N. Union St.	Primary Collector	Residential Collector	
26. Franklin Street Washington St. to S. Union St.	Primary Collector	Residential Collector	Serves a minor collector function
27. Fairfax Street Franklin St. to Pendleton St.	Local	Residential Collector	Serves a minor collector function
28. Reinekers Lane Diagonal Rd. to Duke St.	Local	Residential Collector	Serves a minor collector function
29. Preston Road Quaker La. to Valley Dr.	Local	Residential Collector	Serves a minor collector function
30. Dawes Avenue King St. to Seminary Rd.	Local	Residential Collector	Serves a minor collector function and provides access to NVCC
31. Ford Avenue N. 30th St. to N. Hampton Dr.	Not in Plan	Residential Collector	Serves the Park Center Development

32. Kennedy Street Sycamore St. to Mt. Vernon Ave.	Local	Residential Collector	Serves a minor collector function
33. Landover St. Sycamore St. to Tennessee Ave.	Local	Residential Collector	Serves a minor collector function
34. N. Morgan Street Chambliss St. to Beauregard St.	Local	Residential Collector	Serves a minor collector function
35. Duke Street S. Patrick St. to S. Fairfax St.	Local	Residential	Serves a minor collector function
36. Holmes Run Parkway Van Dorn St. to No. Pickett St.	Local	Residential Collector	Serves a minor collector function
37. N. Ripley Street Holmes Run Pkwy. to Duke St.	Local	Residential Collector	Serves a minor collector function
38. Valley Drive W. Glebe Rd. to Allison St.	Primary Collector	Residential Collector	
39. Gunston Road Quaker Lane to Valley Dr.	Primary Collector	Residential Collector	
40. N. Paxton Street Holmes Run Pkwy. to Duke St.	Local	Residential Collector	Serves a minor collector function
41. N. Pickett Street Holmes Run Pkwy to Duke St.	Local	Residential Collector	Serves a minor collector function
42. S. Reynolds Street Duke St. to Edsall Rd.	Local	Residential Collector	Serves a minor collector function
43. S. Whiting Street Stevenson Ave. to Edsall Rd.	Local	Residential Collector	Serves a minor collector function
44. S. Gordon Street Duke St. to Wheeler Ave.	Residential Collector	Local	
45. Clifford Avenue Mt. Vernon Ave to U.S. 1	Residential Collector	Local	Serves a local function
46. Hume Avenue Mt. Vernon Ave to U.S. 1	Residential Collector	Local	Serves a local function
47. Library Lane North from Seminary Rd.	Residential Collector	Local	Serves a local function
48. Fillmore Avenue Seminary Rd. to Chambliss St.	Residential Collector	Local	Serves a local function
49. St. Asaph Street Franklin St. to First St.	Residential Collector	Local	

50. Union Street Franklin St. to Pendleton St.	Residential Collector	Local
51. Columbus Street Duke St. to Pendleton St.	Residential Collector	Local
52. Janneys Lane Quaker Lane to King St.	Arterial	Primary Collector

Source: City of Alexandria Transportation and Environmental Services

APPENDIX B

TABLES OF TRANSPORTATION DATA

TABLE B-1

TABLE B-1

Comparison of Functional Classification Facilities

System	City of Alexandria Miles	%Miles	%Travel	Northern Virginia (Excluding Alexandria) Miles	%Miles	%Travel	Washington D.C. Miles	%Miles	%Travel
Controlled Access	0	0	0	144.9	13.1	42.5	34.4	10.2	33
Primary Arterial	18.7	9	48	149.7	13.5	17.7	84.8	25.1	35.2
Secondary Arterial	39.26	19	41	463.3	41.7	28.8	152.9	45.2	26.1
Collector Street	9.36	4.5	2	351.7	31.7	11	66.1	19.5	5.7
Local and Residential	139.7	67.5	9	*	*	*	*	*	*
TOTAL	207.02	100	100	1,109.6	100	100	338.2	100	100
Population			109,000			1,097,800			627,400

* Local and Residential streets are not included in C.O.G. system.

Source: Alexandria Data - Dept. of T.&E.S.

Northern Virginia & Washington, D.C. Data - Council of Governments

TABLE B-2

1985 FINAL MODE CHOICE MODEL RESULTS - (Person Trips)

	TO											
	DC CORE	DC NON CORE	MONT. COUNTY	PR. GEO. COUNTY	ARLING-TON CORE	ARLING-TON NON CORE	ALEX	FAIFAX CTY/CN-TY	LOUDOUN COUNTY	PR. WM. COUNTY	EXTERN-AL	TOTAL
	PERSON	PERSON	PERSON	PERSON	PERSON	PERSON	PERSON	PERSON	PERSON	PERSON	PERSON	PERSON
FROM	1985	1985	1985	1985	1985	1985	1985	1985	1985	1985	1985	1985
DC CORE	29029	7178	2015	2325	1836	2023	805	1292	27	58	208	46796
DC NON CORE	185905	108595	31040	25763	11380	13684	5662	8709	172	313	3756	394979
MONT. COUNTY	103394	53242	286256	38170	6493	6613	2484	13968	524	350	19293	530787
PR. GEO. COUNTY	132505	72517	57203	196778	10071	14455	8836	10627	165	466	32787	536410
ARLINGTON CORE	3255	860	259	241	1798	713	266	545	11	17	24	7989
ARLINGTON NON CORE	47584	12548	3751	4286	11266	20777	7992	18564	355	584	475	128182
ALEX	31567	8088	1799	3990	6810	13255	15113	14723	152	742	431	96670
FAIFAX CIY/CNIY	134318	36561	25319	16227	34155	51000	46272	245599	7067	7138	3350	607006
LOUDOUN COUNTY	4249	1217	1558	335	915	1413	630	11088	15777	441	412	38035
PR. WM. COUNTY	22694	5807	3152	2831	7698	8310	9039	42171	1722	53943	4408	161775
EXTERNAL	34825	16119	46515	55506	3485	5104	3844	14531	1884	9871	0	191684
TOTAL	729325	322732	458867	346452	95907	137347	100943	381817	27856	73923	65144	2740313

Source: MWCOG , Transportation Facts and Forecasts for the Washington Metropolitan Region.

TABLE B-3

1995 PERSON TRIPS

	TO											
	DC CORE	DC NON CORE	MONT. COUNTY	PR. GEO. COUNTY	ARLING-TON CORE	ARLING-TON NON CORE	ALEXAN-DRIA	FAIFAX CTY/CN-TY	LOUDOUN COUNTY	PR. WM. COUNTY	EXTERNAL	TOTAL
	PERSON	PERSON	PERSON	PERSON	PERSON	PERSON	PERSON	PERSON	PERSON	PERSON	PERSON	PERSON
	1995	1995	1995	1995	1995	1995	1995	1995	1995	1995	1995	1995
FROM												
DC CORE	36244	8869	2618	3009	2543	3173	1095	1441	32	511	252	59327
DC NON CORE	186686	91267	33670	29431	13490	18384	6621	8396	291	2361	4136	392608
MONT. COUNTY	114857	66746	441468	63742	10077	11971	3875	22352	1373	5171	29973	766951
PR. GEO. COUNTY	192819	91611	71590	254868	14741	23371	13736	22551	295	3831	39458	725423
ARLINGTON CORE	3098	817	262	146	3309	1160	279	472	14	131	251	9595
ARLINGTON NON CORE	45159	12201	3945	2684	16071	36725	9878	19884	601	5271	5061	148181
ALEXANDRIA	26541	7201	1700	2343	6846	15394	29082	14974	270	5491	4401	105340
FAIFAX CTY/CNTY	149652	42892	35862	13679	44436	85737	83504	4044416	11958	10192	64911	6686819
LOUDOUN COUNTY	6720	2082	3405	661	1625	3096	1351	27148	31176	1578	666	79508
PR. WM. COUNTY	29698	8060	5416	4302	11269	15885	17134	90663	7496	861591	9842	285924
EXTERNAL	45989	21585	72793	71862	5602	9610	7318	32712	3893	21410	01	292774
TOTAL	837463	353331	672729	446727	130009	224506	173873	6450091	57399	1216151	91789	3754450

Source: MWCOG , Transportation Facts and Forecasts for the Washington Metropolitan Region.

TABLE B-4

FINAL MODE CHOICE MODEL RESULTS (1985 MODE SPLITS)

	TO											
	DC CORE	DC NON CORE	MONT. COUNTY	PR. GEO. COUNTY	ARLNG-TON CORE	ARLNG-TON NON-CORE	ALEX	FAIRF-AX CITY/C-NTY	LOUDO-UN COUNTY	PR. WM. COUNTY	EXTER-NAL	TOTAL
FROM	MSPLIT 1985	MSPLIT 1985	MSPLIT 1985	MSPLIT 1985	MSPLIT 1985	MSPLIT 1985	MSPLIT 1985	MSPLIT 1985	MSPLIT 1985	MSPLIT 1985	MSPLIT 1985	MSPLIT 1985
DC CORE	66.0	54.0	52.0	31.0	60.0	58.0	44.0	34.0	0.0	0.0	0	60.0
DC NON CORE	59.0	34.0	30.0	15.0	38.0	40.0	28.0	19.0	0.0	0.0	0	44.0
MONT. COUNTY	36.0	12.0	6.0	3.0	10.0	10.0	8.0	2.0	0.0	0.0	0	12.0
PR. GEO. COUNTY	29.0	10.0	7.0	4.0	18.0	15.0	6.0	3.0	0.0	0.0	0	12.0
ARLNGTON CORE	69.0	35.0	34.0	17.0	31.0	38.0	14.0	11.0	0.0	0.0	0	45.0
ARLNGTON NON-CORE	43.0	18.0	11.0	8.0	22.0	14.0	10.0	7.0	0.0	0.0	0	24.0
ALEX	36.0	15.0	13.0	7.0	23.0	16.0	9.0	5.0	0.0	0.0	0	20.0
FAIRFAX CITY/CNTY	25.0	7.0	3.0	2.0	16.0	9.0	4.0	2.0	0.0	0.0	0	9.0
LOUDOUN COUNTY	13.0	2.0	0.0	0.0	7.0	2.0	1.0	0.0	0.0	0.0	0	2.0
PR. WM. COUNTY	13.0	4.0	1.0	0.0	10.0	5.0	1.0	1.0	0.0	0.0	0	3.0
EXTERNAL	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	40.0	20.0	8.0	5.0	20.0	15.0	7.0	3.0	0.0	0.0	0	18.0

NOTE: MSPLIT = % TRANSIT

Source: MWCOG , Transportation Facts and Forecasts for the Washington Metropolitan Region.

TABLE B-5

1995 TRANSIT MODAL SPLIT

	TO											
	DC CORE	DC NON CORE	MONT. COUNTY	PR. GEO. COUNTY	ARLINGTON CORE	ARLINGTON NON CORE	ALEXANDRIA	FAIFAX CTY/CNTY	LOUDOUN COUNTY	PR. WM. COUNTY	EXTERNAL	TOTAL
	MSPLIT 1995	MSPLIT 1995	MSPLIT 1995	MSPLIT 1995	MSPLIT 1995	MSPLIT 1995	MSPLIT 1995	MSPLIT 1995	MSPLIT 1995	MSPLIT 1995	MSPLIT 1995	MSPLIT 1995
FROM												
DC CORE	65.0	55.0	58.0	34.0	66.0	66.0	51.0	39.0	3.0	0.0	0.0	61.0
DC NON CORE	58.0	34.0	35.0	16.0	42.0	47.0	33.0	23.0	4.0	0.0	0.0	45.0
MONT. COUNTY	34.0	12.0	6.0	3.0	10.0	13.0	10.0	3.0	0.0	0.0	0.0	11.0
PR. GEO. COUNTY	28.0	10.0	9.0	4.0	21.0	20.0	8.0	4.0	2.0	0.0	0.0	13.0
ARLINGTON CORE	72.0	39.0	40.0	19.0	34.0	40.0	19.0	15.0	0.0	0.0	0.0	46.0
ARLINGTON NON CORE	44.0	21.0	13.0	10.0	23.0	16.0	12.0	9.0	0.0	0.0	0.0	24.0
ALEXANDRIA	37.0	17.0	16.0	8.0	25.0	18.0	11.0	6.0	0.0	0.0	0.0	19.0
FAIFAX CTY/CNTY	22.0	7.0	4.0	2.0	14.0	9.0	5.0	2.0	0.0	0.0	0.0	7.0
LOUDOUN COUNTY	15.0	3.0	1.0	1.0	9.0	6.0	3.0	2.0	0.0	0.0	0.0	3.0
PR. WM. COUNTY	16.0	2.0	2.0	0.0	12.0	7.0	3.0	1.0	0.0	0.0	0.0	3.0
EXTERNAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	37.0	18.0	8.0	5.0	21.0	16.0	8.0	3.0	0.0	0.0	0.0	15.0

NOTES:

1. HOME-BASED-WORK TRIPS (HOME-TO-WORK, WORK-TO-HOME) IN PRODUCTION - ATTRACTION FORMAT ARE SHOWN.

2. ROUND IV COOPERATIVE FORECAST OF HOUSEHOLDS, POPULATION, AND EMPLOYMENT WAS ASSUMED AS INPUT.

3. TRANSIT FARES WERE ASSUMED TO INCREASE AT THE RATE OF INFLATION.

4. COMMITTED HIGHWAY AND TRANSIT FACILITIES WERE ASSUMED, INCLUDING THE OPERATION OF 89.5 MILES OF METRORAIL.

5. ALSO ASSUMED WAS THE CONSTRUCTION OF A PARTIAL HOV GRID IN NORTHERN VIRGINIA CONSISTING OF DIAMOND LANE TREATMENT ON THE BELTWAY AS WELL AS THE PORTION OF I-66 BETWEEN THE BELTWAY AND ROUTE 123. GRADE SEPARATION OF HOV WAS ASSUMED ON I-66 WEST OF RT. 123 TO RT. 234, AS WELL AS THE DULLES CORRIDOR TO THE AIRPORT AND SHIRLEY HIGHWAY TO THE POTOMAC WILLIAM-STAFFORD LINE. BUSES WERE ASSUMED TO OPERATE ON THE HOV GRID WITH LIMITED TRANSFERS AT KEY LOCATIONS.

Source: MWCOG , Transportation Facts and Forecasts for the Washington Metropolitan Region.

TABLE B-6

ATC FINANCIAL DATA

	FY 1991 ACTUAL	FY 1992 BUDGET	FY 1993 ESTIMATED
Operating Revenues	859,519	1,094,000	1,315,000
Operating Expenses	2,083,656	2,578,600	3,272,100
Net Transit Service Cost	1,224,137	1,484,600	1,957,100
Operating Ratio	41.3%	42.6%	40.2%
Capital Outlay Items	1,886,295	953,810	20,000
City Contribution	3,100,137	2,438,410	1,977,100

Source: Alexandria Transit Company

APPROVED TMP's AS OF 11/91

	PROJECT NAME	DATE TMP APPROVED	SQUARE FEET	DWELLING UNITS	STATUS	TYPE OF DEVELOPMENT
1)	Park Center*	03/17/84			BLT	OCHR
2)	Colecroft	09/22/87	18,000	287	BLT	CR
3)	Radnor/Buchanan	09/22/87	277,000		UC	
4)	Braddock Place	10/19/87	376,100	162	UC	OR
5)	King St. Station	11/14/87	603,735	263H	UC	OCH
6)	Wyndam Apartments	04/12/88		492	BLT	R
7)	Alex. Tech Ctr IV	05/14/88	171,000		UC	OHC
8)	Braddock Center	05/14/88	317,000	183	BLT	O
9)	Mark Center	09/06/88	230,000		BLT	O
10	Hechinger/Quaker Hill	09/12/88	164,550	300UC		CRO
11)	King St Exchange	12/06/88	187,195		BLT	O
12)	Calibre Landmark	12/17/88		400	BLT	R
13)	Retail Whse. Ctr	12/17/88	49,824		BLT	CW
14)	1700 Prince	02/25/89	88,517			OC
15)	Skypointe	09/26/89	150,000	150		OR
16)	CSX	10/14/89	484,000		UC	WO
17)	Pepco	10/14/89	346,194		UC	W
18)	Tech Ctr V	10/14/89	67,063			O
19)	Breckenridge	11/06/89	123,000	125		OR
20)	Carlyle	04/18/90	3,378,000	3,246	UC	OCRH
21)	Boat U.S.	05/12/90	158,404			CO
22)	Cameron Center Hotel	5/12/90		165H		H
23)	King Street Metroplace	6/16/90	443,310	165H		HOC
24)	N. Royal Street Plaza	6/16/90	90,307			O
25)	Mill Race	6/16/90	205,000	680		RCO
26	Home Depot	9/14/91				C
			8,114,7334	6,616		

SYMBOLS

O - Office
H - Hotel
C - Commercial/Retail
R - Residential
W - Warehouse

UC - Under Construction
CS/# - Construction Start Date
BLT - Built

* Signed TMP-like agreement

APPENDIX C

BIBLIOGRAPHY

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Alexandria Federation of Civic Associations, "Ad Hoc Innovative Transportation Committee Report (5/24/89) "Alexandria" May 24, 1989.

Automobile Club of Southern California, Traffic Engineering, Los Angeles, California, 1978.

Baerwald, John E. (ed.), Transportation and Traffic Engineering Handbook, 2nd Edition, Washington: Institute or Transportation Engineers, 1965.

City of Alexandria, 1974 Master Thoroughfare Plan, Alexandria: 1974.

Commonwealth of Virginia, Narrative Report for the Commonwealth of Virginia, 1974 National Transportation Study, Richmond: Office of the Governor and Division of State Planning and Community Affairs, 1974.

Commonwealth of Virginia, Northern Virginia 2010 Transportation Plan: Facilities, Financing, Continuing Process, Richmond: Department of Transportation, January, 1989.

Greater Washington Board of Trade, Transportation Policies: A Regional Agenda, Washington: Regional Chamber of Commerce, January, 1989.

Hamburger, Wolfgang S. (et al), Residential Street Design and Traffic Control, Washington: Institute of Transportation Engineers, 1989.

Hamburger, Wolfgang S. (ed.), Transportation and Traffic Engineering Handbook, 2nd Edition, Washington:Institute of Transportation Engineers, 1982.

Institute of Traffic Engineers, System Considerations for Urban Arterial Streets, Washington, D.C., 1969.

Leisch, Jack E., "Capacity Analysis Techniques for Design of Signalized Intersections", Public Roads:A Journal of Highway Research, Volume 34, No. 9 (1967).

Meyer, Michael D. (et al), A Toolbox for Alleviating Traffic Congestion, Washington: Institute of Transportation Engineers, 1989.

National Academy of Sciences, Highway Capacity Manual, Special Report No. 87, Washington:Highway Research Board, 1965.

Reed, M.F. and Granum, J.O., Functional Highway Classification in Urban Areas, Washington: Automotive Safety Foundation, 1967.

Transportation Committee, Transportation Priorities: 1988, Alexandria: Alexandria Chamber of Commerce, December, 1988.

Transportation Planning Board, Transportation Plan for Federal Highway Administration Certification, 1972, Washington: Metropolitan Washington Council of Governments, 1972.

Transportation Planning Board, A Transportation Special Report, Washington: Metropolitan Washington Council of Governments, Winter, 1989.

Transportation Planning Board, 1989 Survey and Evaluation of Ride- Finders Ridesharing Network, Washington: Metropolitan Washington Council of Governments, January, 1990.

U.S. Department of Transportation, Federal Highway Administration, Highway Functional Classification, Washington, D.C., 1974.